

# Coupling Mechanism between Tourism Industry Integration and Tourism Industry Competitiveness

——taking Chongqing as an Example

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**Abstract**—Tourism industry integration expand tourism attraction system, reduce the cost of tourism industry, promote technique ability of tourism industry, expand tourism market share, strengthen the links with other industries, and ultimately strengthen tourism industry competitiveness. Industry integration have become an important index of tourism industry competitiveness, The paper, with the help of coupling theory in physics, constructs the index and coupling evaluation model of tourism industry integration and tourism industry competitiveness, taking Chongqing as an example, analyzes the functional mechanism of interreaction between tourism industry integration and tourism industry competitiveness. Results show that the comprehensive evaluation score of tourism industry integration and tourism industry competitiveness presented rising trend from 2003 to 2011, coupling coordinative degree can be divided into two stages, low Coupling coordinative degree is from 2003 to 2009, moderate coupling coordinative degree is from 2009 to 2011, correlation of the comprehensive evaluation score of tourism industry integration and tourism industry competitiveness is high, hence, we must coordinate with the relationship between each other well.

**Keywords**—industry integration; tourism industry competitiveness; coupling mechanism; coupling coordination model; Chongqing

## I. INTRODUCTION

Tourism industry integration has become tide and trend. Tourism industry have coupling features with other industries. Tourism industry integration play an important role in tourism development. Research achievements about tourism industry integration mainly focus on dynamic cause, model, process, path selection and influence( Xu, 2008; Sun, 2011; Li, 2008; Ma, 2010; Li, 2009; Xu, 2011). Tourism industry competitiveness show differences and advantages in regional industrial competition, the strength of tourism industry competitiveness is vital to regional tourism development. Main research fields about tourism industry competitiveness include two aspects, one are about factors of tourism industry competitiveness(Guo, 2004; Zhang, 2006; Yi, 2006), the other is about assessment method of industry competitiveness(Wan, 2001; Wen, 2009; Su, 2003). The research about tourism industry integration is still in primary stage, most of research achievements are belongs

to category of qualitative study, and the lack of quantitative research. Research achievements about tourism industry competitiveness are abundant, but little research on relation between industry integration and tourism industry competitiveness.

Relation between industry integration and tourism industry competitiveness is very close, on one hand, industry integration promote tourism industry competitiveness, on the other hand, improvement of tourism industry competitiveness also prompt regional tourism industry integration. Obviously, tourism industry integration and tourism industry competitiveness is coupling relationship. Hence, the paper, under the guidance of coupling theory, investigate relation between industry integration and tourism industry competitiveness, and empirically analyses coupling relationship between tourism industry integration and tourism industry competitiveness taking Chongqing as an example.

## II. COUPLING MECHANISM ANALYSIS BETWEEN TOURISM INDUSTRY INTEGRATION AND TOURISM INDUSTRY COMPETITIVENESS

### A. Coupling connotation

Coupling concept is first originated from physics, original meaning is cooperative degree of two electronic components or circuit network. Coupling refers to the phenomenon of two system mutual interaction from the view of system theory. Coupling theory has a strong explanatory power on mutual interaction of two systems. Hence, it is widely used in ecology, agriculture, biology and economics. Coupling degree is an important index which measures the coupling degree of two system. Synergetics study self organization structure produced by system cooperation; two systems produce cooperation behavior by coupling interaction, and come into the higher function body. The key which system transform from disorder to order is synergistic effects of inner system order parameter, coupling degree is index of reflecting synergistic effects size(Liu, 2005). Measuring Coupling degree usually used by coupling degree model and coupling coordination degree model, they reflect coupling state index of inner-system. Tourism industry integration system and tourism industry competitiveness system influence each other by coupling elements of their systems.

### B. Coupling mechanism analysis

Tourism industry integration system and tourism industry competitiveness system have impacts on each other, featured with remarkable coupling. On one hand, tourism industry integration strengthens tourism industry competitiveness by recourse integration, function integration, market integration and technique integration; on the other hand, tourism industry competitiveness prompt tourism industry integration.

Tourism industry integration can promote tourism industry competitiveness. Firstly, tourism industry make other industries possessed with tourism elements by recourse integration, which enrich tourism products types, and expand tourism attraction system. Secondly, function integration make other industries affiliated tourism function, such as physical tourism, educational visits, medical tour, which diversify tourism products and tourism pattern. Thirdly, tourism market integration can exploit project in other industrial market, such as tourism real estate, exhibition tourism, which expand tourism industry market. At last, technique integration make tourism introduce new technique, such as technology, information, patent, which improve labor productivity. Briefly, tourism industry integration expand tourism attraction system, reduce the cost of tourism industry, promote technique ability of tourism industry, expand tourism market share, strengthen the links with other industries, and ultimately strengthen tourism industry competitiveness.

Which enhancing tourism industry competitiveness can prompt tourism industry integration can embody two aspects, one is promotion of tourism industry competitiveness can make production elements more concentration, such as talents, science and technology, polices, resources, which tourism industry depend on, and is dynamic cause of tourism industry integration; the other is that tourist income and the numbers of tourism enterprise is the important index of measuring tourism industry competitiveness. Enhancement of tourism industry competitiveness can prompt tourism enterprise invest in other industries, and tourism industry integration with other industries constantly.

## III. EVALUATION INDEXES AND METHOD

### A. Evaluation indexes

Choosing evaluation indexes follow the rule, firstly, according to connotation of industry integration and tourism industry competitiveness, we choose typical indexes which can accurately reflect their connotation. Secondly, data available, the indexes we choose can be found in statistical annual books. Thirdly, the indexes can be discussed by expert, we revise some indexes according to expert opinions. Evaluation method of industry integration mainly includes NEGOPY, Herfindahl-Hirschman Index and Entropy index. Due to particularity and availability of tourism industry, we choose the number of tourism patent, tourism total income, tourism industry investment, the indirectly number of employees in tourism industry; tourism industry competitiveness include the

number of domestic tourist reception, domestic tourism income, the number of foreign tourist, foreign tourism income, the number of travel agency, travel agency business income; the number of Star Hotel, Star Hotel business income.

TABLE I. THE EVALUATION INDICATORS SYSTEM AND ITS WEIGHTS ON THE COUPLING TOURISM INDUSTRY INTEGRATION AND TOURISM INDUSTRY COMPETITIVENESS SYSTEM

Coupling systems	Evaluation indexes	Entropy weight
Tourism industry integration system	X1 the number of tourism patent	0.2221
	X2 tourism total income	0.2359
	X3 tourism industry investment	0.2497
	X4 the indirectly number of employees in tourism industry	0.2922
Tourism industry competitiveness system	X5 the number of domestic tourist reception	0.1155
	X5 domestic tourism income	0.1162
	X7 the number of foreign tourist	0.1202
	X8 foreign tourism income	0.1192
	X9 the number of travel agency	0.1224
	X10 travel agency business income	0.1216
	X11 the number of Star Hotel	0.1343
	X12 Star Hotel business income	0.1506

### B. Method

Entropy is a mathematical method of calculating comprehensive score by measuring evaluation indexes of system, is a method of objectively weight. The paper adopt entropy method to evaluate the indexes weight, it can reduce deviation produced by research in some degree. We choose the data of tourism industry integration and tourism industry competitiveness in Chongqing from 2003 to 2011 to empirically test.

Type of evaluation indexes is not same, we need standardize data in order to eliminate dimension. the methods of eliminate dimension mainly include extremum method, efficacy function, normalization method, etc. the paper use SPSS software to standardize data, calculate the entropy value, the weight value, and the comprehensive scores. Table.1 shows the weight value, Table.2 shows the Comprehensive scores.

Borrowing Coupling Coefficients model from physics, we get coupling function of multiple systems.

$$C_n = n \left\{ \frac{(u_1 \times u_2 \times u_3 \times \dots \times u_m)}{[(u_1 + u_2 + u_3 + \dots + u_m)]^{\frac{1}{n}}} \right\}^{\frac{1}{n}}$$

We deduce coupling function of tourism industry integration and tourism industry competitiveness according to the formula above:

$$C_2 = 2 \left\{ \frac{(u_1 \times u_2)}{[(u_1 + u_2) (u_1 + u_2)]^{\frac{1}{2}}} \right\}^{\frac{1}{2}}$$

C2 is coupling degree of two systems, u1 and u2 is evaluation indexes, coupling degree  $C_2 \in [0, 1]$ . When  $C_2=1$ , coupling degree is maximum, which mean benign coupling and the system will be tend to ordered structure; when  $C_2=0$ , coupling degree is minimum, which mean the system is under disorder condition. The coupling degree model is the important indexes measuring the coupling degree of industry integration and tourism industry competitiveness, but this model is difficult to reflect the

synergistic effect of industry integration and tourism industry competitiveness some times. When comprehensive score of two systems is both low, their coupling degree is high. It can lead to wrong result if absolutely rely on this model, so the paper use coupling coordination degree model in order to reflect coordination of tourism industry integration and tourism industry competitiveness objectively.

It structure coupling coordination model of tourism industry integration and tourism industry competitiveness to judge the degree of coordination of tourism industry integration and tourism industry competitiveness.

$$D(u_1, u_2) = \sqrt{C(u_1, u_2) \times T(u_1, u_2)}$$

$$T(u_1, u_2) = \alpha U_1 + \beta U_2$$

D is coupling coordination degree, C is coupling degree. T is comprehensive assessment index of tourism industry integration and tourism industry competitiveness, it reflect coordination degree.  $u_1, u_2$  is comprehensive assessment index of tourism industry integration and tourism industry competitiveness,  $\alpha, \beta$  is undetermined coefficient. According to related research results, we suppose  $\alpha = 0.4, \beta = 1.6$ , it is because interaction of tourism industry integration and tourism industry competitiveness is difference, tourism industry integration can boost promotion of tourism industry competitiveness, but there is many reasons for promotion of tourism industry competitiveness, except promoting of tourism industry integration.

TABLE II. COUPLING COORDINATION DEGREE BETWEEN INDUSTRY INTEGRATION AND TOURISM INDUSTRY COMPETITIVENESS OF CHONGQING DURING 2003—2011

year	2003	2004	2005	2006	2007	2008	2009	2010	2011
U1	0.0580	0.0600	0.0711	0.0843	0.1009	0.1149	0.1316	0.1699	0.2094
U2	0.0422	0.0599	0.0737	0.0847	0.1008	0.1170	0.1419	0.1709	0.2087
D	0.2195	0.2234	0.2695	0.2907	0.3175	0.3408	0.3710	0.4129	0.4571

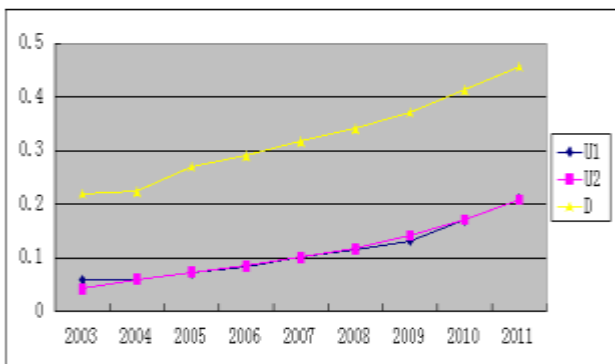


Figure 1. The coupling coordination degree between industry integration and tourism industry competitiveness of Chongqing during 2003—2011

## IV. EMPIRICAL RESULTS

### A. Comprehensive evaluation scores

From figure.1 and table2, tourism industry integration comprehensive evaluation scoreU1 and tourism industry competitiveness comprehensive evaluation scoreU2 show increasing tendency. From 2003 to2011, tourism industry comprehensive evaluation scoreU1 is increasing from 0.080 to 0.2094, tourism industry competitiveness comprehensive evaluation scoreU2 is increasing from0.0422 to 0.2087.The correlation between tourism industry integration and tourism industry competitiveness reaches more than 0.9, which show significant correlation and coupling relationship.

### B. Coupling coordination degree

From 2003 to 2011, coupling coordination degree of tourism industry integration and tourism industry competitiveness in Chongqing is rising from0.2195 to 0.45714. Coupling coordination degree is less than 0.4, which demonstrate it is low degree coupling, and synergistic effect is low. Coupling coordination degree is between 0.4 and 0.5, which show synergistic effect is moderate. Synergistic effect is high when coupling coordination degree is between 0.5 and 0.8. Synergistic effect is extreme coordination when coupling coordination degree is more than 0.9..

From 2003 to 2009, coupling coordination degree of tourism industry integration and tourism industry competitiveness in Chongqing is less than 0.4, which demonstrate mutual promotion of tourism industry integration and tourism industry competitiveness is limited. This is because development level of tourism industry integration and tourism industry competitiveness is low. From 2009 to2011, coupling coordination degree value is between 0.4 and 0.5, which demonstrate synergistic effect is moderate. Chongqing has made great progress in economy in this period and it promote tourism industry integration rapidly, tourism industry competitiveness can be further improved. Synergistic effect of tourism industry integration and tourism industry competitiveness constantly strengthen and reach medium grade.

## V. CONCLUSION

Results display correlation of tourism industry integration and tourism industry competitiveness is high, industry integration has become an important element which affects tourism industry competitiveness. Tourism industry integration is prompted by some advanced production factors, such as science and technology, information, management and brand, which make tourism industry relate with industry, agriculture, forestry, etc. It enriches tourism product types, extend tourism industry chain, improve tourism industry competitiveness. Practice has proved that the higher the degree of regional tourism industry is, the stronger regional tourism industry competitiveness is. Promotion of tourism industry competitiveness also boosts regional tourism industry integration.

There is coupling relationship between tourism industry integration and tourism industry competitiveness. From 2003 to 2011, coupling coordination degree present

increasing tendency, but synergistic effects of tourism industry integration and tourism industry competitiveness still is at low lever, it still has very large promotion space. We need boost promotion of tourism industry integration and tourism industry competitiveness constantly, and coordinate the relationship between them.

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