Quantitative Analysis of the Structured Productivity of Tourism Industry: Taking Sichuan Province as an Example

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Abstract

Reasonable structure of the tourism industry is very important for the long-term development of the tourism industry for one country (region). By the quantitative method to analyze the structure of productivity in the development economics, the computation methods of the structure proportion of the tourism industry, the structure change index and the structure productivity coefficient are proposed in the theory, and based on the empirical study taking Sichuan Province as the example, the idea to improve the productivity structure of the tourism industry is proposed in the article.

Keywords: Structure of tourism industry, Productivity, Quantitative analysis

The tourism industry is a comprehensive economic industry, and its industry structure not only directly influences the total growth of the tourism industry, but decides the development level and economic benefit of the tourism industry. To study the influence of the tourism industry structure on the economic development of tourism, by referring and applying the theoretical and quantitative method of analyzing the structure productivity in the development economics, the structure productivity of the tourism industry is analyzed and studied in the article.

1. Analysis Method of Tourism Industry Structure Productivity

For the structure productivity of the tourism industry, the structure proportion of various industries in the tourism industry, the structure change index and the structure productivity coefficient of the tourism industry can comprehensively reflect the rationalization of the tourism industry structure and its influences and functions to the tourism economic growth.

1.1 Structure proportion of tourism industry

The structure proportion of various industries in the tourism industry reflects the contributions and influences of various industries to the gross of tourism economy. Because the tourism industry is a comprehensive economic industry including numerous industries, so to collect and analyze data, the tourism industry is divided into six industries including traffic, hotel, catering, tour, amusement and shopping. Then corresponding index data (such as income, foreign exchange earning, and reception amount) are selected to analyze the structure proportion of these six industries, so the important status and influences of various industries in the tourism industry can be known. The computation formula is

$$R_i = \frac{X_i}{\sum_{i=1}^{n} X_i} \times 100\%$$

Where, R_i is the composing proportion of the industry i in the tourism industry, X_i is the scale of certain index of the industry i in the tourism industry, and n is the industry amount analyzed in the tourism industry.

1.2 Structure change index of tourism industry

The structure change index means the change value of the composing proportion of certain index in the tourism industry in neighboring two years or several years, and it reflects the change of the tourism industry structure in different years. Generally speaking, big structure change index means big change of interior structure of the tourism industry, and small structure change index means small or relatively stable change of interior structure of the tourism industry. So by computing and analyzing the industry structure change index of the tourism industry in different development terms, it can be seen that whether the tourism industry structure can accord with the development scale of the tourism industry in corresponding terms, which could offer scientific references for the constitution of proper tourism industry policies. The

computation formula of the tourism industry structure change index is

$$GI_s = \arccos \frac{\sum_{i=1}^{n} X_{i(t)} \cdot X_{i(t-1)}}{\sqrt{\sum_{i=1}^{n} X_{i(t)}^2 \cdot X_{i(t-1)}^2}}$$

Where, GIs is the structure change index of tourism industry, Xi(t) is the proportion of certain index of the department i in the tourism industry in the year of t, Xi(t-1) is the proportion of certain index of the department i in the tourism industry in the year of t-1, and n is the department amount of the industry in the tourism industry.

1.3 Structure productivity coefficient of tourism industry

The structure productivity coefficient means the elastic coefficient of the tourism industry structure change index to the tourism economy total growth rate, and it reflects the drive function and influence of the tourism industry structure change to the development of the tourism industry. Generally speaking, bigger structure productivity coefficient indicates that the driving force of the tourism industry structure change to the development of the tourism industry is larger. Contrarily, smaller structure productivity coefficient indicates that the driving force of the tourism industry structure change to the development of the tourism industry is smaller. However, when applying the structure productivity coefficient to analyze the tourism industry structure, the rationalization and the height of the tourism industry structure should be combined and analyzed together. By the computation and analysis of the structure productivity coefficient, the actuality and the development tendency of the rationalization and the height of the tourism industry structure can be further discovered. The computation formula of the tourism industry structure productivity coefficient is

$$P_s = \frac{r_i}{GI_{si}}$$

Where, Ps is the structure productivity coefficient of the tourism industry, ri is the total growth rate of certain index of the tourism industry in the term of i, and GIsi is the structure change index of certain index of the tourism industry in the term of i.

2. Analysis of Structure Productivity of Sichuan Tourism Industry

Relative statistical materials are seen in Table 1.

2.1 Computing the structure proportion of Sichuan tourism industry

According to the data in Table 1, the structure proportion of Sichuan tourism industry from 2005 to 2008 can be computed. The computation result is listed in Table 2.

(1) The proportions of traffic and tour occupy large proportion in the whole tourism income, then the catering and shopping.

(2) The proportions of the incomes of most industries in Sichuan tourism industry from 2005 to 2008 tend to descending, especially the descending extents of traffic and tour are large, and they respectively drop for 3.4% and 3.0%, and the shopping and hotel present the sign of fluctuation, and the proportion of the amusement ascends largely for 6.2%.

(3) Because of the impacts of earthquake in 2008, the total income dropped than 2007, and the proportions of various industries except for shopping were descending.

That indicates the composing changes of various industries in Sichuan tourism industry are large, and they need to be analyzed mainly to find out the cause of change. Of course, the influence of the change on the structure of Sichuan tourism industry needs to be analyzed combining with the industry structure change index.

2.2 Computing the structure change index of Sichuan tourism industry

According to relative materials, the structure change index of Sichuan tourism industry can be computed, and the computation result is seen in Table 3.

The data in Table 3 indicate that the fluctuation of change is large, especially from 2005 to 2006, the fluctuation extent can achieve 3.74, but the fluctuations from 2006 to 2007 and 2008 are small. In fact, that shows that the interior structure change of Sichuan tourism industry is large from 2005 to 2006, which reflects not only the drive of the development of Sichuan tourism industry to various departments and the active participation and development of various departments of tourism factor, but also the influences of some unreasonable factors in the structure change, for example, the proportions of traffic, tour, and shopping were respectively ascending for 2.2%, 1.0%, and 2.7%, but the proportions of hotel and amusement respectively ascended for 2.3% and 3.1%, which indicated that the industry structure change of Sichuan tourism industry presented negative correlation with the income growth of the tourism

industry, and the influence of unreasonable factors in the structure change of Sichuan tourism industry from 2005 to 2006 still existed. From 2006 to 2008, the structure change indexes of the tourism industry are close, and the change of the proportions of various industries is small, which shows that the industry structure in these years is relatively stable, so the industry structure basically presents positive correlation with the tourism income growth, and the influence of the unreasonable factor of the industry structure change is very small.

2.3 Computing the structure productivity of Sichuan tourism industry

To compare the structure productivity levels of Sichuan tourism industry, the structure productivity coefficients of the tourism industry from 2005 to 2008 are respectively computed, and relative computation result is seen in Table 4.

The computation result shows that the structure productivities computed in three years are very lower than 4, and the structure productivity of 2006 is the highest one, and it is 3.23, and the structure productivity of 2008 is the lowest one, and it is 1.80 (because of earthquake), and the structure productivities present descending, which indicates the driving force of the Sichuan tourism industry structure change to the tourism industry development is small. With the development of the tourism industry, the industry structure also changes, and this change should bring more energy for the development of the tourism industry, but the fact is not so.

3. Ideas to Enhance the Structure Productivity of Sichuan Tourism Industry

3.1 Adjust and optimize the market structure proportion of the tourism industry in various industries

The structure of six industries in the tourism industry should be harmonized, i.e. the structure should be optimized, because the structure optimization will produce higher productivity. The optimization of the proportion of various industries should achieve maximum profits, and that is a continually developing and perfecting process, and it needs long time to complete it.

3.2 The key of structure optimization is to strengthen the weak parts

At present, in various industries of Sichuan tourism industry, the income proportions of the tour and the amusement in the whole tourism industry is low, and in fact, these two industries are weak in the industry structure, that means these two industries still have a large development space, i.e. the proportions of the tour and the amusement in the whole industry structure should be enhanced. In fact, the productivities of these two industries in the tourism industry are high, so after adjusting, the proportions of six industries in the tourism industry structure are relatively balanced.

3.3 Form a market-oriented operation mechanism

From above analysis, the industry structure productivities of various industries in Sichuan tourism industry all are low, and the structure of six factors is not harmonious, and some important departments are relatively weak, i.e. there still is large market space. However, it needs the innovation to fill the market space, especially, the market-oriented operation mechanism should be formed to adjust and optimize the industry structure, harmonize and develop the industries, and enhance the structure productivity of the industry.

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Table 1. Domestic tourism income structure of Sichuan from 2005 to 2008

Composing Year	Traffic (ten thousands Yuan)	Hotel (ten thousands Yuan)	Catering (ten thousands Yuan)	Tour (ten thousands Yuan)	Amusement (ten thousands Yuan)	Shopping (ten thousands Yuan)	Total (ten thousands Yuan)
2005	1490016	1081440	1228877	1361433	853662	941272	6956700
2006	1818545	1689900	1722460	1764837	1051377	1432381	9479500
2007	2179513	1811236	2160685	2041049	1839352	1758165	11799000
2008	1936172	1601540	1939021	1787615	1644485	1864467	10773300

Note: To be convenient for the structure analysis, part items are combined properly, and the traffic includes post communication, and the amusement includes other items. And the source comes from Sichuan Tourism Statistics.

Table 2. Domestic tourism income structure proportion of Sichuan from 2005 to 2008

Composing Year	Traffic (%)	Hotel (%)	Catering (%)	Tour (%)	Amusement (%)	Shopping (%)
2005	21.4	15.5	17.7	19.6	8.0	17.8
2006	19.2	17.8	18.2	18.6	11.1	15.1
2007	18.5	15.4	18.3	17.3	15.6	14.9
2008	18.0	14.9	18.0	16.6	15.2	17.3

Table 3. Computation table of Sichuan tourism industry structure change index

Year / Index	2005	2006	2007	2008
GIs	10.27	6.53	7.08	6.92

Table 4. Structure productivity of Sichuan tourism industry

Year	Total growth rate (%)	Structure change index (Gisi)	Structure productivity (Ps)
2006	36.26	6.53	3.23
2007	24.47	7.08	2.87
2008	-8.69	6.92	1.80