

# A Comparative Study of China-U.S. Tourism Characteristic Industry GVC<sup>1</sup> Embedment Degree

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## Abstract

As the largest branch of service trade, tourism trade has contributed continuously to the global economy. Starting from the related departments of tourism trade, this article used the method of Wang *et al.* (2013) to conduct value-added decomposition of the global input-output table for the period 2000-2014 and measured the GVC position and GVC participation index between China and the United States for first time. The author just intends to consider the related tourism industries, but it didn't integrate the related industries to a complete tourism industry. The comparative study found that China's road transportation sector has advantage over the United States', but overall the GVC position and GVC participation index of China tourism characteristic departments are less than the United States'. For the whole embedment degree of GVC, there is still a gap between China and the United States.

## Keywords

China-U.S., Tourism Characteristic Industry, GVC Embedment Degree

## 1. Introduction

Bilateral tourism trade, as an important form of international service trade, has continuously increased its share in international trade, and has become an important means for all countries to participate in the international production share and enhance their international competitiveness. In recent years, with the continuous deepening of global production share and the continuous expansion of international tourism, tourism trade, as the largest branch of service trade, has

<sup>1</sup>GVC is an abbreviation for Global Value Chain, which is abbreviated to avoid redundant statements.

been fully integrated into the development process of global value chains. Inbound and outbound tourism involves many sectors such as transportation, accommodation and catering, travel agencies and tourism operators, postal and express, entertainment, telecommunications and other sectors, and has become one of the most important industries affecting trade growth between China and the United States. In this paper, the calculation does not integrate the components of the tourism industry, such as transportation, accommodation and catering, wholesale and retail, into relatively complete tourism trade data. However, by measuring the GVC position and GVC participation index of highly relevant sectors of tourism trade is often helpful for understanding the GVC embedment degree in tourism trade more intuitively and accurately.

The article is organized as follows: the first part is introduction; the second part is literature review; the third part is analysis of measurement results; and the last part is conclusions and inspirations of this paper.

## 2. Literature Review

Most foreign scholars used the input-output method to study the effect of tourism economy (Ruiz, 1985; Fletcher, 1989; Briassoulis, 1991; Surugiu, 2009; Atan and Arslanturk, 2012; Soulieand Valle, 2014) [1]-[6]. Domestic scholars on the research of the added value of tourism trade from the aspect of the country or region input-output table, based on the national economy industry classification screening characteristics of tourism industry in the added value accounting. The domestic scholars' research on the value added of tourism trade mainly starts from the input-output table at the national or regional level, and the "tourism characteristic industry" is selected based on the industry classification of the national economy to calculate the value added. Yang Lianling *et al.* (2014) for the first time used a non-competitive input-output method to calculate the domestic value added of tourism characteristic industry between China and the United States based on discontinuous China and U.S. input-output data [7]. At present, the method of calculating the value-added trade by means of input-output model has been improved (Hummels *et al.*, 2001; KWW, 2010; Johnson and Nogueira, 2012; Wang *et al.*, 2013) [8] [9] [10] [11]. Yan Yunfeng (2018) used the global input-output analysis method to calculate the GVC status index and participation index of the service industry in China and the United States from 2000 to 2014 and compared the service trade competitiveness of the two countries [12]. However, in the research of tourism trade, the current domestic research mainly focuses on the comparative advantage of traditional total trade competitiveness (Cang Wenyi, 2018) [13]. GVC embedment degree in the tourism characteristics industry has not yet been measured from the perspective of global value chains.

### 2.1. Measurement Methods of GVC Embedment Degree

Koopman (2010) defines the "GVC position index" and "GVC participation index" to measure the embedment degree of different economies/industries in the

global value chain. This article uses its practice to measure the embedment degree of GVC in the tourism characteristics industry in China and the United States.

## 2.2. The GVC Position Index of Tourism Characteristic Industry

The GVC position index of tourism characteristic industry is used to measure the position of tourism characteristic sector  $t$  of country  $c$  in the global value chain. The calculation formula is as follows:

$$\text{GVC\_Position}_{tc} = \ln 1 + \frac{\text{IV}_{tc}}{E_{tc}} - \ln 1 + \frac{\text{FV}_{tc}}{E_{tc}}$$

Among them,  $E_{tc}$  is the total exports of tourism characteristic sector  $t$  of country  $c$ .  $\text{IV}_{tc}$  is the value added contained in the export of intermediate goods of tourism characteristic sector  $t$  of country  $c$ .  $\text{FV}_{tc}$  is the foreign value added in the export of tourism characteristic sector  $t$  of country  $c$ . When

$$\frac{\text{IV}_{tc}}{E_{tc}} > \frac{\text{FV}_{tc}}{E_{tc}},$$

It denotes that the sector  $t$  is at the upstream of the global value chain. When

$$\frac{\text{IV}_{tc}}{E_{tc}} < \frac{\text{FV}_{tc}}{E_{tc}},$$

it denotes that the sector  $t$  is at the downstream of the global value chain. The larger the  $\text{GVC\_Position}_{tc}$  index is, the higher position of the tourism characteristic sector  $t$  of country  $c$  in the global value chain is. That means it is in the upstream position; otherwise it is in the downstream position.

## 2.3. The GVC Participation Index of Tourism Characteristic Industry

The GVC participation index of tourism characteristic industry is used to measure the participation degree of tourism characteristic sector  $t$  of country  $c$  in the global value chain. The calculation formula is as follows:

$$\text{GVC\_Participian}_{tc} = \frac{\text{IV}_{tc}}{E_{tc}} + \frac{\text{FV}_{tc}}{E_{tc}}$$

Among them,  $\text{IV}_{tc}/E_{tc}$  is the GVC forward participation index, denoting the degree to which the intermediate products exported by tourism characteristic sector  $t$  of country  $c$  are used by other countries to produce the final product and export it to a third country. The larger the index is, the more upstream of the tourism characteristic sector  $t$  of country  $c$  in the global value chain is.  $\text{FV}_{tc}/E_{tc}$  is the GVC backward participation index, denoting the degree of foreign added value used in the export of tourism characteristic sector  $t$  of country  $c$ . The larger the index is, the more downstream of the tourism characteristic sector  $t$  of country  $c$  in the global value chain is. Therefore, the greater GVC participation index is, the more important position in global value chain the country's participation in international production share has.

Based on the above algorithm, this paper combines the decomposition results of the value-added exports and the calculation of forward linkages to calculate the participation in international production share and position in the global value chain of tourism characteristic industries in China and the United States.

### 3. Analysis of China-U.S. Tourism Characteristics Industry GVC Embedment Degree's Measurement Results

#### 3.1. The GVC Position Index of China-U.S. Tourism Characteristics Industry

In **Table 1**, from the perspective of the subdivided sectors, the GVC status index of the land and waterway sectors in China's tourism characteristics sector has always been higher than that of the United States, while the GVC position index of other sectors is smaller than that of the United States. The GVC position index of China's tourism characteristics sectors are more affected by the financial crisis, while the GVC status index of the relevant US sector is less volatile. Overall, the comprehensive GVC position index of China's tourism industry-related industries experienced a change from 0.056 to 0.046 and then 0.051. The US GVC position index went through 0.125 to 0.139 and then 0.166. However, its GVC position index is still much higher than China. TC is an abbreviation for Tourism Characteristics.

#### 3.2. The GVC Participation Index of China-U.S. Tourism Characteristics Industry

In **Table 2**, from the perspective of the GVC Forward Participation Index, the

**Table 1.** Trends of the GVC position index of China-U.S. tourism characteristics industry<sup>2</sup>.

TC Sectors <sup>3</sup>	2000		2007		2014	
	China	U.S.	China	U.S.	China	U.S.
Accommodation and Catering	0.045	0.053	0.040	0.057	0.055	0.057
Land Transport	0.138	0.098	0.079	0.068	0.078	0.068
Water Transport	0.099	0.086	0.085	0.063	0.057	0.087
Air Transport	0.011	0.025	-0.04	0.015	-0.029	0.032
Sightseeing	-0.101	0.26	-0.118	0.301	0.131	0.363
Shopping	0.103	0.118	0.099	0.118	0.089	0.118
Entertainment	-0.001	0.048	0.017	0.028	-0.005	0.025
TC Industry	0.056	0.125	0.046	0.139	0.051	0.166

Source: WIOD database.

<sup>2</sup>The results of this paper all measure the GVC position and participation index of the relevant sectors of tourism characteristics industry between China and the United States from 2000 to 2014. Due to space limitations, all the tables in the paper have selected the results of 2000, 2007, and 2014 for display. All data from the WIOD database.

<sup>3</sup>TC is an abbreviation for Tourism Characteristics Sectors.

**Table 2.** The trend of the forwards and backwards participation index of China-U.S. tourism characteristics industry.

TC Sectors	2000				2007				2014			
	China		U.S.		China		U.S.		China		U.S.	
	FLI	BLI	FLI	BLI	FLI	BLI	FLI	BLI	FLI	BLI	FLI	BLI
Accommodation and Catering	10.52	5.65	10.72	3.66	11.70	5.65	10.72	4.23	10.47	4.60	10.72	4.61
Land Transport	20.42	4.90	15.86	4.99	16.79	7.93	15.46	7.88	14.29	5.74	15.90	8.29
Water Transport	18.29	7.10	16.43	6.87	19.34	9.58	16.74	9.61	13.6	7.33	18.81	8.93
Air Transport	10.37	9.14	10.56	7.86	11.86	16.43	11.94	10.31	10.51	13.8	13.70	10.11
Sightseeing	24.30	10.67	46.58	1.78	26.64	12.49	46.58	1.78	20.74	5.88	46.58	1.95
Shopping	18.52	6.91	14.56	1.82	16.77	5.77	15.51	2.24	13.4	3.69	15.51	2.67
Entertainment	10.85	10.89	7.30	2.58	12.51	10.61	7.30	3.81	7.13	7.62	7.30	4.66
TC Industry	14.29	8.04	19.06	5.87	15.39	10.23	22.20	6.37	12.64	7.03	25.79	6.51

Source: WIOD database.

relevant sectors of China's tourism characteristics industry have all experienced a process of rising first and then decreasing, while the US tourism characteristic industry related departments are basically all steadily rising. Except for land, waterways, entertainment, and shopping, the GVC's forward participation index is higher than that of the United States. Other departments are smaller than the United States. Judging from the GVC backward participation index, only the land sector is better than the United States in the relevant departments of China's tourism characteristics, and other sectors are worse than the United States.

In **Table 3**, from the comprehensive GVC engagement index, China's GVC participation in recent years has been declining, while the United States has been rising. In general, compared with the United States, the participation of GVCs in China's tourism industry is much lower, and most of them are located downstream of the global value chain. However, the position of China's land transport sector in the global value chain has always been better than United States.

#### 4. Conclusions and Inspirations

Through calculations, we find that the position of the relevant sectors in China's tourism industry is far lower than that of the United States in the global value chain and has been declining in recent years. At the same time, compared with the United States, the participation of China's tourism industry in the global value chain is mainly concentrated in the downstream. Apart from the relatively strong competitive advantage of the land sector, China has a much lower GVC embedment degree than the United States. In the future, China needs to further expand the opening of tourism trade, and while maintaining the competitiveness of its dominant sectors, it should focus on the balanced development of other disadvantaged sectors. Meanwhile, China should deepen the structural reform of

**Table 3.** The trend of comprehensive GVC participation index of China-U.S. tourism characteristics industry.

TC Sectors	2000		2007		2014	
	China	U.S.	China	U.S.	China	U.S.
Accommodation and Catering	16.17	14.38	17.35	14.95	15.07	15.33
Land Transport	25.32	20.85	24.72	23.34	20.03	24.19
Water Transport	25.40	23.31	28.92	26.35	20.93	27.74
Air Transport	19.51	18.42	28.29	22.26	24.31	23.81
Sightseeing	34.97	48.37	38.13	48.37	26.62	48.54
Shopping	25.43	16.38	22.54	17.75	17.09	18.17
Entertainment	21.74	9.88	23.12	11.10	14.75	11.96
TC Industry	22.33	24.93	25.62	28.57	19.67	32.30

Source: WIOD database.

the supply side of the tourism industry, expand the length of entry and exit tourism products and service chains, and actively enhance the GVC position and participation of relevant sectors in the tourism industry in the global value chain.

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