タイトル	An analysis of direct tourism contribution to Shandong's economy Based on the Tourism Satellite Account
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引用	北海商科大学論集, 10(1): 39-52
発行日	2021-02-20

 受理日：2021/02/20

An analysis of direct tourism contribution to Shandong's economy
Based on the Tourism Satellite Account
観光サテライトアカウントに基づく山東省経済への直接的観光貢献分析

YU LIQIAN　　于 丽茜

要旨

中国が経済保有する観光統計システムを基に観光業の直接貢献度を推定することは非常に困難であるが、観光サテライトアカウント（TSA）は、近似的な直接貢献度を分析するための有効なアプローチである。しかしながら、未だに地域 TSA（RTSA）を設立する統一的な基準は世界で確立されていない。山東省は 2008 年に地域 TSA（R-TSA）を構築したが、多額の資金の必要性や人的資源上の問題から、その後は継続していない。本論文は，TSA のフレームワークに基づき、既存データを用いて 2012 年の山東省経済に対する観光業の直接貢献度を推計したものである。表 6 で示した観光の直接貢献度を計算する基礎となる観光剥離係数（Tourism Stripping Coefficient）を用いて推計した結果、2012 年の山東省における観光業の直接貢献額は 19 億 3666 万元であり、地域 GDP の 3.87 % を占めていることが明らかとなった。

キーワード：観光業の直接貢献、TSA、山東省経済

Abstract

Based on current China's tourism statistics system, it is very hard to estimate tourism's economic contribution. Tourism Satellite Account (TSA) is an effective approach to analyze the direct tourism contribution to a nation or a region. Moreover, there is no unified standard to establish regional TSA (R-TSA) in the world. Shandong province sets up a regional TSA (R-TSA) in 2008. Unfortunately, because it needs large funds and human resources, it is not continuing to compile afterward. This article considers based on the TSA framework and uses the existing data to optimize the calculation method to calculate the direct tourism contribution Shandon in 2012. Table 6 shows the tourism stripping coefficient, which is the basis to calculate the direct tourism contribution. As the result of analysis, it obtained the direct tourism contribution is 1936.66 million yuan, which is 3.87 % of the total GDP in Shandon Province in China.

Keywords：direct tourism contribution, TSA, Shandong Province's economy

受理日：2021/02/20

1. Introduction

According to *The Travel & Tourism Competitiveness Report 2019*, China's competitiveness is 13th among 140 economies. According to the Ministry of culture and tourism of China's publication 2019, it shows that in 2019, China's tourism revenue is 6.63 trillion yuan, up 11% from a year earlier. At the beginning of 2020, influenced by virus duplicate, tourism suffered a severe loss. However, the first "May Day" holiday after China's epidemic has stabilized, China's domestic tourism revenue reached 35.06 billion yuan. Notably, in 2016, China's 13th Five-year plan, a new tourism model, "all-for-one tourism[1]" has been proposed. It confirms the leading role of tourism in the new era of China. Unfortunately, China's current tourism economic statistics system cannot fully reflect the tourism contribution to the economy. Tourism Satellite Account (TSA) is a practical and official approach to analyze the direct tourism contribution to a nation or a region. It could realize the international comparison, improve tourism statistics. Because of unevenly distributed tourism activities within a country, the national TSA could not provide enough information to help regional development. Therefore, establishing the RTSA could give tourism an exact position in the economy in a given region.

China has got some results on RTSA. For instance, Jiangsu is the first province-level TSA with meaningful significance, strictly following TSA: RMF2008（Li ， Li and Chen 2004）. Moreover, Zhejiang, Guangdong, and Hainan continually attempt to make RTSA. Unfortunately, they are all not entirely enough. Shandong Province also makes much effort to set-up Shandong Tourism Satellite Account 2008 (SDTSA2008) from 2007 to 2011, the first RTSA to complete the ten tables. However, Because of deficiencies in China's statistics system, many required data need a specific investigation. It needs large funds and human resources, which leads it to become a one-off account. After that, the government still uses the tourism revenue and non-monetary index, such as the number of inbound tourists, to reflect tourism's contribution and scale. According to the Shandong statistical yearbook 2019, the tourism revenue in 2018 is 9892.4 million Yuan, which increased by 1.2% than in 2017. Under this background, the use of RTSA to further understand the critical position of tourism in Shandong's economy to strengthen the degree of attention, improve the structure of tourism products, rational allocation of resources, will play an important role in further tapping the potential of Shandong's tourism, promoting the development "all-for-one" tourism.

Based on current China's statistics system, it is impossible to calculate the tourism contribution. Hence, this study's primary purpose is to take advantage of the TSA framework and the secondary data from the input-output table and various tourism surveys to estimate the direct tourism contribution to Shandong's economy in 2012. The direct tourism value-added is an important index

[1] All-for-one tourism is a new tourism model that aims to develop a project in partnership with all stakeholders and be involved in overall planning and cooperative development of all industries.

to measure tourism contribution based on TSA's requirement. Moreover, this paper uses the existed data to optimize the calculation method for providing an experience for developing RTSA in the future. Furthermore, during the process of obtaining tourism value-added, it shows the deficiencies of China's tourism statistics system.

Firstly, this paper will introduce the development of tourism in Shandong province, and then it will have a simple introduction about China's tourism statistics system. Secondly, the article will introduce the process of calculating direct tourism value-added. Thirdly, it indicated the critical results of the empirical model. The concluding section will also consider the limitation of this paper and the point to study further.

2. The methodology

When TSA's approach is used to analyze tourism's contribution to the economy, a critical step is to define a list of classification of tourism characteristic industries and tourism characteristic products. However, there is no unified framework to develop RTSA. Therefore, to identify Shandong tourism characteristic industries and tourism characteristic products, this paper will take advantage of the *Tourism Satellite Account: Recommended methodological framework 2008 (TSA: RMF2008)*, *China's Industrial classification for national economic activities (GB/T 4754-2017)*, *The statistical classification of China tourism industries and related industries 2018* and *SDTSA2008*.

Concerning the calculation of Direct tourism value-added, firstly, using the secondary data from China's input-output table 2017 (China I-O table 2017), Shandong input-output table 2012 (Shandong I-O table 2012) to determine the total production of each tourism industry in Shandong 2012. Secondly, through the formula, to get the value-added rate of required industries in Shandong 2012. At the same time, after handling the data from SDTSA2008, obtaining the component of tourism consumption in Shandong 2012. Thirdly, combining the value-added rate and tourism consumption to get tourism value-added. Finally, according to this formula:

$$Tourism\ stripping\ coefficient = \frac{Tourism\ value\ added}{Industry\ value\ added}$$

to get the tourism stripping coefficient. And then, the direct tourism value-added would be obtained. Because of the lack of data resource, this paper makes some hypothesis and rearrangement of data to estimate the direct tourism contribution to Shandong's economy in 2012. The methodological procedure would be shown in Figure 1.

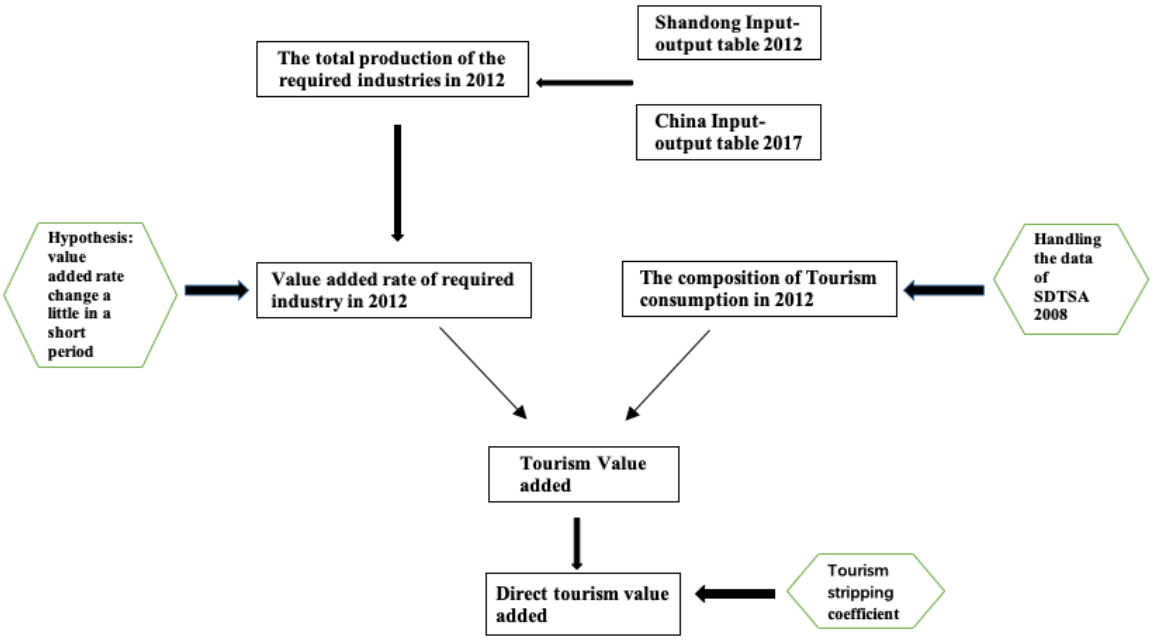

Figure 1. The methodological procedure

3. The problem of China's tourism statistics system

The imperfect of China's statistics system is one of the main reasons to obstruct the development of China's tourism satellite account. Chang, Kang, and Li (2005a) introduced that China's tourism statistics system is an integral part of the national economic statistical system, and its development and evolution cannot be separated from the whole of China's statistics development. From 1949 to 1984, China has always adopted the Material Product System (MPS), and China's tourism statistics system is also the product of the planned economy and MPS. Later, China gradually adopted the System of National Account (SNA), and then China's statistics system began to change.

From 1993, it adopts the SNA. GDP has become the core economic index. China's System of National Accounts (2002) is the significant file of this period, formulated based on SNA 1993. This system indicates that China's national economic accounting has successfully transitioned to the international standards adopted by market economy countries. In 2015, *The classification of tourism and related industries of China* had been published based on the SNA. It accelerates the tourism industry's development, and the statistical scope of tourism and related industries is defined scientifically.

This paper would discuss the problems of China's tourism statistics system concerning the TSA. Table 1 below shows the basic content and the tourism indices of China's tourism statistical system. It is not difficult to notice that most tourism indices in China's statistics system are the non-

monetary indices. These indexes are hard to reflect on the tourism contribution and tourism expenditure component. According to the TSA: RMF 2008, one of TSA's benefits is to reflect the tourism economy from both demand and supply sides. From TSA's perspective, China's tourism statistics system lacks many demand-side indexes. For example, there is no index about outbound tourism consumption. Moreover, the consumption index is too simple, which could not reflect the tourism expenditure composition (Chang et al., 2005). Lacking the required data leads to difficulties in establishing the TSA. Hence, in this paper, to calculate the direct tourism value added based on TSA, it used the SDTSA2008 as the reference to proportion the tourism consumption in different tourism characteristic industries and products.

Table 1. China's tourism statistics system

The classification of China's tourism statistical system	The detail tourism related index
Inbound tourism statistics	Number of inbound tourists, Number of overnight visitors, and International tourism income by foreigners, compatriots in Hong Kong, Macao, and Taiwan
Domestic tourism statistics	Domestic tourism arrivals, tourism income, and expenditure per visitor by urban and rural residents
Outbound tourism statistics	Number of citizens traveling abroad, total number of outbound tourism organized by travel agencies, Number of Hong Kong and Macao, Taiwan and outbound tourists and outbound tourism expenditure
Travel agency scale and business statistics	The number and employment of domestic and international travel agencies in various regions of the country, the total assets of the national travel agencies, operating income, taxes, profits, total labor productivity
Star-rated hotel scale and business statistic	The number of star-rated hotels, rooms, beds, original fixed assets and operating income
Tourism education and training statistics	The number of tourism universities and colleges and the number of students in the country

Source: The yearbook of China tourism statistics.

4. The calculation of direct tourism value-added

4.1 Identify the classification of tourism characteristic industries and tourism characteristic products

Typically, identifying the classification of tourism characteristic industries and tourism characteristic products is the first step to develop TSA. As the content described above, Table 2 shows Shandong's classification of tourism industries and products based on *TSA: RMF 2008, China's Industrial classification for national economic activities (GB/T 4754-2017), The statistical classification of China tourism industries and related industries 2018 and* SDTSA2008. Table 2 also shows the correspondence between the tourism industries and the tourism-related sector of Shandong I-O table 2012.

Table 2. The classification of Shandong Tourism Industries and products

TSA:RMF2008	Shandong Tourism Industries and Tourism connected industries	Shandong Tourism products and tourism connected products	Input-output tables correspondence	Input-output tables Code
Accomodation for visitors	Accomodation for visitors	Accomodation for visitors	Accommodation and catering	31
Food-and beverage-serving activities	Food-and beverage-serving activities	Food-and beverage-serving service		
Railway passenger transport	Railway passenger transport	Railway passenger transport service	Transportation, warehousing and postal	30
Road passenger transport	Road passenger transport	Road passenger transport		
Water passenger transport	Water passenger transport	Water passenger transport service		
Air passenger transport	Air passenger transport	Air passenger transport service		
Transport equipment rental	Transport equipment rental	Transport equipment rental	Leasing and commercial service	35
Travel agencies and other reservation services activities	Travel agencies and other reservation services activities	Travel agencies and other reservation services activities		
Cultural activities	Cultural, sports and recreational activities	Cultural, sports and recreational activities	Cultural, sports and recreational	41
Sports and recreational activities				
Retail trade of Country-specific tourism characteristic goods	Travelling shopping	Travelling shopping	Wholesale and retail trade	29
Other country-specific tourism characteristic activities	Post and communication	Post and communication	Information transmission, software and information technology services	32
	Residents service, repair and other service	Residents service, repair and other services	Residents service, repair and other services	38
	Financial and Insurance	Financial and Insurance	Finance	33

Source: TSA: RMF 2008; China's Industrial classification for national economic activities (GB/T4754-2017); The statistical classification of China tourism industries and related industries 2018 and *SDTSA2008. Edited by the author.*

4.2　The calculation method and process

1)　Calculating the value-added of tourism-related industries

Before calculating the value-added rate of tourism industries, it is necessary to obtain data about total production and intermediate input. The formula is shown below:

$$Value\ added\ rate = \frac{Total\ production - Intermediate\ input}{Total\ production}$$

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However, the official public basic matrix of Shandong I-O table 2012 only covers 42 industry sectors and 139 commodities. It does not show much detailed information such as Railway passenger transport accommodation, Etc. China I-O table 2017 has a basic industry sector matrix and divided the 42 sectors into 149 commodities. Compared with the China I-O table 2012 with 139 commodities, China I-O table 2017 divided the transport sector into passenger transport and goods transport, which is more suitable for tourism industries' requirements to be more accurate. This paper hypothesizes that the percentage of these four items is the same at the provincial and national levels. Therefore, it used the China I-O table 2017 to calculate partial data, lacking in the Shandong I-O table 2012.

After the calculation, Table 3 shows the value-added rate based on China I-O table 2017, and table 4 shows the value-added rate of the Shandong Tourism Industries in 2012.

Table 3. The value-added rate based on China I-O table 2017 (Unit:10,000 Yuan)

	Production (1)	Total production of I-O table (2)	Percentage (3)	Intermediate input (4)	Value added rate (5)
Railway passenger transport	48316418.218	66950936.914	0.722	23507942.465	0.513
Road passenger transport	94361205.461	254307248.862	0.371	58488999.527	0.380
Water passenger transport	3021850.537	1025533259.089	0.003	2114089.996	0.300
Air passenger transport	46231809.900	111470291.676	0.415	31035782.391	0.329

Source: China I-O table 2017

Note: 1. The figure in (1) from table 1.1 of China I-O table 2017 (149 commodities×149 commodities)

2. The figure in (2) from table 3.1 of China I-O table 2017 (70 commodities×60 industries)

3. The figure in (3) = (1) / (2)

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Table 4. Value-added rate of Shandong tourism industries in 2012 (Unit:10,000 Yuan)

	Total production	Intermediate input	Value Added rate
Accomodation for visitors	3326310.464	1937001.372	0.418
Food-and beverage-serving activities	14396389.598	5190981.751	0.639
Railway passenger transport	2496879.000		0.513
Road passenger transport	20067011.280		0.380
Water passenger transport	7076694.773		0.300
Air passenger transport	1036994.341		0.329
Transport equipment rental	625446.019	112601.876	0.820
Travel agencies and other reservation services activities	15033098.997	8926856.533	0.406
Cultural, sports and recreational activities	2614641.360	958804.392	0.633
Travelling shopping	81884447.743	16810458.732	0.795
Financial and Insurance	38872904.702	19511839.336	0.498
Post and communication	10257333.109	4696018.362	0.542
Residents service, repair and other services	10473249.505	4473433.960	0.573

Source: Shandong I-O table 2012

Note: The total production of railway, road, water, and air passenger transport are calculated through the figures from the Shandong I-O table multiply by the percentage, which is obtained in table 3.

2)　Calculating the tourism stripping coefficient

When calculating the tourism stripping coefficient, it needs to allocate the total tourism expenditure according to each industry's proportion. Because Shandong domestic tourism sampling survey is not to investigate every year, and from the previous survey in 2001 has for a long time. Hence, in this paper, the proportion of tourism expenditure based on SDTSA 2008 as the reference.

SDTSA2008, on the whole, more strictly followed the TSA requirements, because the required data was carried out in the specific investigation, which could make the data more accurate. The total amount of tourism expenditure is 27370769.6 in 2008. the percentage of tourism expenditure of each industry has been calculated, and the results are shown in Table 5 column 3. According to the Shandong yearbook 2013, the total tourism expenditure in 2012 is 4519.7 million yuan. The accommodation and food and beverage account for 211.3 million and 328.9 million, the specific figures shown in the Shandong yearbook 2013. Hence, according to the tourism expenditure proportion 2008 to arrange the total tourism amount in 2012, the last column of Table 5 shows the tourism expenditure component in 2012.

Table 5. Tourism expenditure component (Unit:10,000 Yuan)

Shandong Tourism Industries	Tourism expenditure in 2008 (1)	Total amount in 2008 （2）	Tourism expenditure proportion (3)	Total amount in 2012 (4)	Tourism expendiure in 2012 (5)
Accomodation for visitors	2427586.600	27370769.600	8.87%	39794479.000	2113202.000
Food-and beverage-serving activities	4682244.000		17.11%		3289319.000
Railway passenger transport	897774.200		3.28%		1305258.911
Road passenger transport	4867533.500		17.78%		7077050.145
Water passenger transport	715850.800		2.62%		1040625.626
Air passenger transport	1023739.400		3.74%		1488313.515
Transport equipment rental	57954.500		0.21%		84364.295
Travel agencies and other reservation services activities	2812329.500		10.28%		4088882.717
Cultural, sports and recreational activities	1030341.000		3.76%		1497864.190
Travelling shopping	6984294.800		25.52%		10154357.206
Financial and Insurance	643582.600		2.35%		935568.201
Post and communication	417481.700		1.53%		606865.805
Residents service, repair and other services	810057.200		2.96%		1177916.578

Source: SDTSA 2008; Shandong year book 2013

Note: 1. Figures in (1) and (2) from SDTSA2008

2. The amount of Accommodation for visitors and food beverage serving activities in 2012 from Shandong year book 2013

3. 39794479 is the total tourism expenditure in 2012 deduct 2113202 and 3289319.

4. The formula of figures in (5):(5) = (4) × (3)

In general, only part of the products of tourism characteristic industries are invested in tourism consumption, so its value-added needs to be stripped out of tourists' consumption according to a certain proportion and included in tourism value-added. The proportion of tourists' consumption in the value-added provided by a tourism characteristic tourism industry is called the tourism stripping coefficient (Li and Li 1999). The tourism stripping coefficient refers to the ratio of the added value created by the tourism expenditure to the industry's value-added (Ge 2010; Xing, Qiang and Wang 2016; Yan and Xiong 2017). The calculation method:

$$Industry\ value\ added = Total\ production \times Value\ added\ rate$$

$$Tourism\ value\ added = Tourism\ expenditure \times Value\ added\ rate$$

$$Tourism\ stripping\ coefficient = \frac{Tourism\ value\ added}{Industry\ value\ added}$$

Therefore, after the calculation, the tourism stripping coefficient shows in table 6.

Table 6: The calculation table of tourism stripping coefficient (Unit:10,000 Yuan)

	Tourism expenditure	Value added rate	Total Production	Industry value added	Tourism value added	Stripping coefficient
Accomodation for visitors	2113202.000	0.418	3326310.464	1390397.774	883318.436	0.635
Food-and beverage-serving activities	3289319.000	0.639	14396389.598	9199292.953	2101874.841	0.228
Railway passenger transport	1305277.750	0.513	35184323.112	18065689.863	670205.959	0.037
Road passenger transport	7076927.777	0.380	18090304.131	6877181.274	2690353.619	0.391
Water passenger transport	1040778.540	0.300	3207273.162	963461.292	312648.716	0.325
Air passenger transport	1488419.093	0.329	20220546.341	6646332.452	489231.495	0.074
Transport equipment rental	84260.295	0.820	625446.019	512844.144	69090.533	0.135
Travel agencies and other reservation services activities	4088857.890	0.406	15033098.997	6106242.464	1660839.038	0.272
Cultural, sports and recreational activities	1498017.187	0.633	2614641.360	1655836.968	948685.458	0.573
Travelling shopping	10154496.085	0.795	81884447.743	65073989.011	8069829.923	0.124
Financial and Insurance	935707.495	0.498	38872904.702	19361065.366	466039.112	0.024
Post and communication	606978.429	0.542	10257333.109	5561314.747	329091.203	0.059
Residents service, repair and other services	1177745.628	0.573	10473249.505	5999815.545	674695.712	0.112

Note: Calculated by the author

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3) Calculation of the direct tourism value-added

Finally, the formula to calculate the tourism value added is

$$Direct\ tourism\ value\ added = Industry\ Value\ added \times Tourism\ Stripping\ coefficient$$

After the calculation, the total direct tourism value added is 19366609.66 ten thousand Yuan. From the Shandong yearbook 2013, Shandong's total GDP was 50013.24 million Yuan in 2012. Therefore, the direct tourism value-added account for 3.87 % of the total GDP.

4) Analysis of the result

The total direct tourism value-added of Shandong in 2012 is about 1936.66 million yuan, 3.87 % of the total GDP. In 2008, the tourism value added was 1377.97 million Yuan, which accounted for 4.45% of the total GDP. Comparing the result of 2012 and 2008, it decreased by 0.58%. During the process of calculating direct tourism value-added, it identifies 13 tourism characteristic industries in Shandong. Among these industries, the most significant contribution to the direct tourism value added was traveling shopping, which reached 41.67%. The second is road passenger transport activities, contributing 13.89% to the direct tourism value-added. Food and beverage services accounted for 10.86%. Travel agencies and other reservation services activities were accounting for 8.58%. Other industries contributed less than 5%. The industry with the smallest contribution was transport equipment rental, which was only 0.36 percent. The detailed information is shown in figure 2.

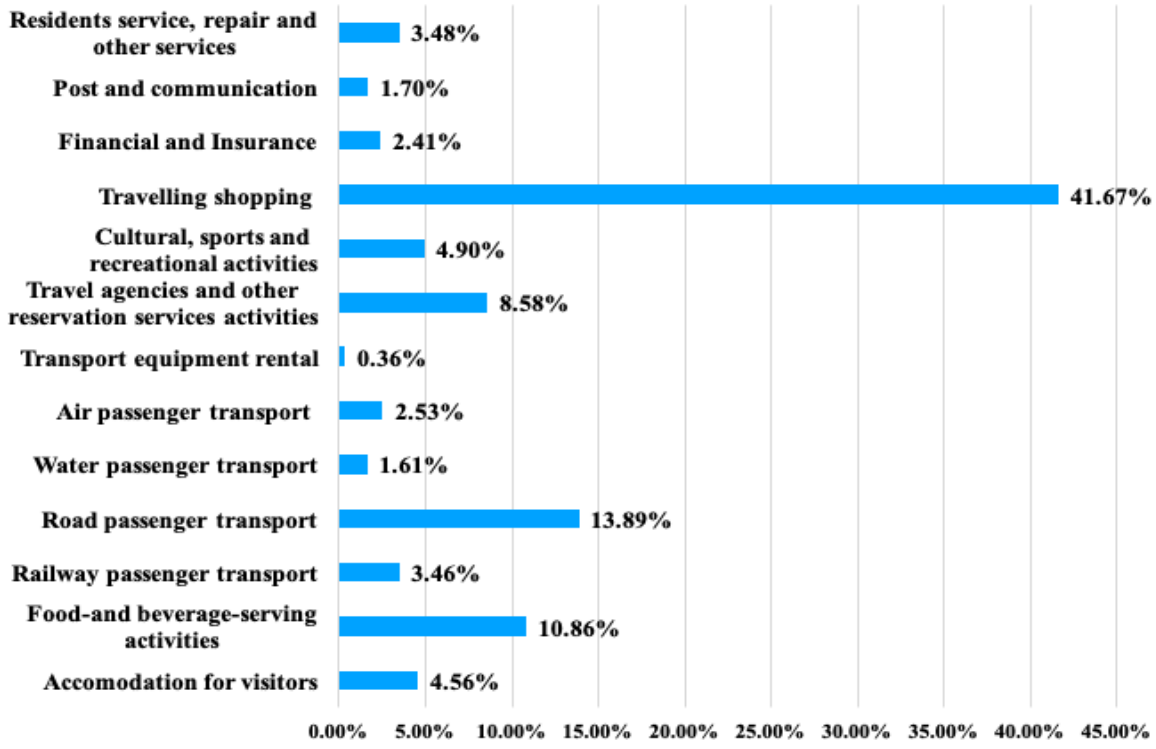

Figure 2. The proportion of direct tourism value-added of each industry

5. Conclusion and limitation

Among 13 tourism industries were road passenger transport, which contributed a relatively large proportion. It is possibly related to the development of road transportation in Shandong. Because Shandong province's total highway mileage reached 275600 kilometers, ranking second in China. The highway density reached 175.9 kilometers per 100 square kilometers, ranking third in China. It provides a robust infrastructure for road passenger transport.

On the other hand, road transport is mostly chosen by visitors who take an excursion. This is also certified by the direct tourism value-added of accommodation only accounted for 4.56%, that perhaps because of the most tourists are same-day visitors. Therefore, it is better to formulate a strategy for attracting overnight visitors, which would stimulate the development of other tourism industries at the same time. However, it also needs to consider other accommodation conditions, such as Airbnb, second-home, etc. These emerging types do not include in this paper. It also would be the topic for further study.

Moreover, traveling shopping has the highest tourism value-added among 13 tourism industries, which is a bit of overestimation compared to SDTSA2008. The data for traveling shopping from the wholesale and retail sector in the Shandong I-O table also includes non- tourism shopping. One of the roof reasons is the lack of specific investigation and detailed tourism expenditure about it.

This paper has some limitations that need to be considered in future research. Firstly, when this paper calculates the tourism value-added, the consumption data takes the purchase price as the statistical criterion, while the supply-side data obtained through the input-output table takes the producers' price as the statistical criterion. The difference between the two is mainly tax. Hence, Shandong's total tourism direct tourism value-added in 2012 is about 1936.66 million yuan, which is 3.87% of the total GDP. However, it decreased by 0.58% compared with 2008. The result tends to be more reliable. Further study should focus on unifying the statistical criterion. Secondly, because China's tourism statistics system has a small statistical dimension, most of the data on the demand side are rearranged, and some assumptions are made, which will lead to errors in the results. Thirdly, according to TSA: RMF 2008, establishing TSA's basic structure based on the overall balance of tourism demand and supply in a country's economy. The TSA's purpose is to analyze in detail the demand for tourism goods and services within a country's economy, observe its relationship to related supplies, and describe how these supplies are combined with other economic activities. However, the total balance of tourism demand and supply in a country does not exist in this region. Therefore, the establishment of RTSA also needs to fully consider the region's characteristics and reasonably establish a region-based TSA.

Furthermore, while calculating the tourism contribution, to establish the RTSA, implement the tourism sample survey is the fundamental part. Tourism expenditure composition could obtain through the tourism sample survey. Secondly, using the secondary data from the I-O table, it is necessary to determine how much is consumed due to tourism. Hence, it is necessary to implement specific investigations. Thirdly, the unified standard is essential to make a comparison between regions. Because the provincial I-O table format is the same in China, it might be possible to establish a unified framework. Although this paper has some limitations, it provides the experience for creating the RTSA. The optimization way of increasing the feasibility of establishing RTSA. Also, the shortage of Chinese tourism statistics will increase the difficulty of compiling RTSA. Therefore, TSA's establishment is an excellent opportunity for China to complete and increase the demand side index. TSA data has a high quality, which could imply the importance of tourism in the national economy and benefit from studying tourism. Furthermore, to make the calculation result more accurate, it is necessary to collect more detailed data for further study.

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