| | |
|---|---|
| タイトル | TWO-TIME COMPARATIVE ANALYSIS OF REGIONAL TOURISM INDUSTRY ECONOMIC STRUCTURE IN CHINA USING REGIONAL TOURISM SATELLITE ACCOUNT |
| 著者 | 于, 丽茜; YU, LIQIAN |
| 引用 | |
| 発行日 | 2021-10-01 |

2021 年度　博士論文

# 地方観光サテライト勘定を用いた中国の地方観光産業経済構造に関する 2 時点比較分析

# TWO-TIME COMPARATIVE ANALYSIS OF REGIONAL TOURISM INDUSTRY ECONOMIC STRUCTURE IN CHINA USING REGIONAL TOURISM SATELLITE ACCOUNT

商学研究科ビジネス専攻

21870013

于 丽茜

TABLE OF CONTENTS

# Chapter 1 Introduction

## 1.1 Research Background

According to the World Travel and Tourism Council (WTTC), tourism has become one of the fastest-growing industries(WTTC, 2019). Tourism is a global industry in which practically every country participates. Tourism has developed into an important source of growth for both China and the global economy. In China, international tourism revenue climbed from 45.814 billion US dollars in 2010 to 131.2154 billion US dollars in 2019 (Figure1). Domestic tourism income in China also increased to 5,725.092 billion Yuan in 2011 from 1,257.977 billion Yuan in 2010 (Figure 2). Tourism has developed into a significant economic force in a number of nations, including China, and one of the most


active economic sectors.

Figure1. China's International tourism Revenue from 2010 to 2019

Source: The yearbook of China tourism statistics 2010-2019, edited by the author.

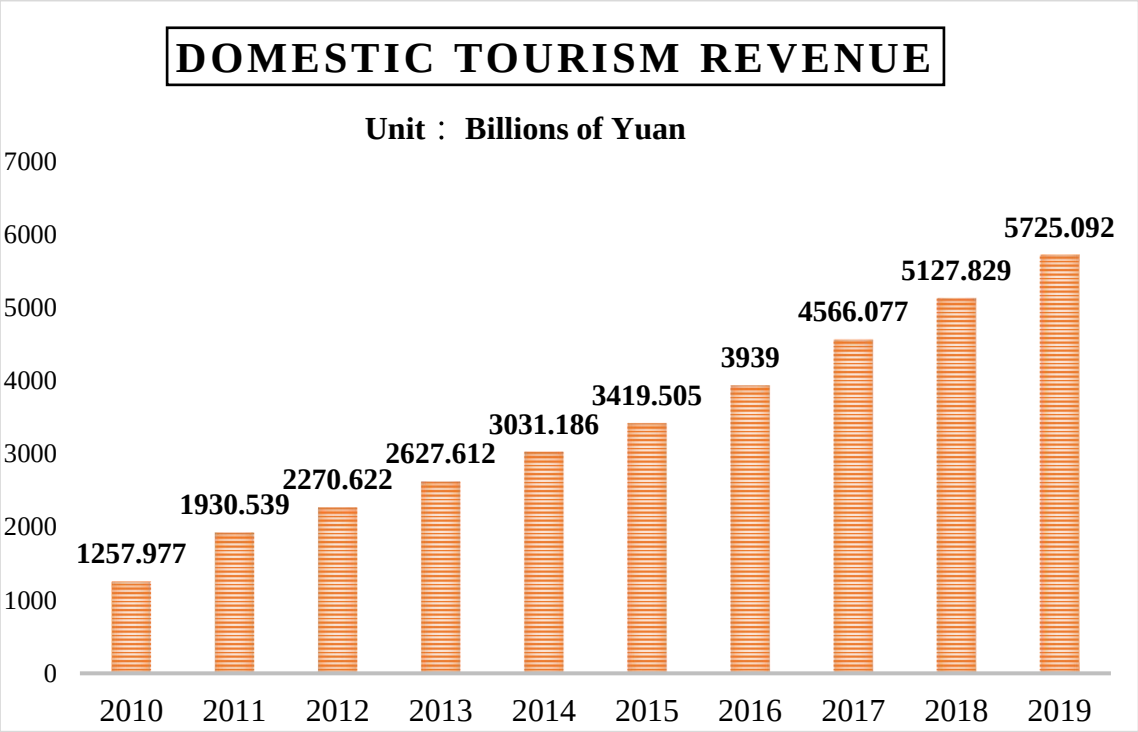


Figure 2. China's Domestic tourism revenue from 2010 to 2019

Source: The yearbook of China tourism statistics 2010-2019, edited by the author.

Although the tourism industry sustained substantial harm due to COVID-19, from May 2020, China's tourism industry rebounded in the post-epidemic period. From May 1 to 5, 2020, mainland China welcomed 115 million domestic tourists and generated 47.56 billion yuan in domestic tourism revenue[1]. Domestic tourism revenue was 113.23 billion yuan during the May 1 holiday in 2021, up 138.1 percent year on year and recovering to 77.0 percent of the same period before the epidemic on a comparable basis. In addition, there were 230 million domestic tourist trips made nationwide, up 119.7 percent year on year and recovering to 103.2 percent of the same period before the epidemic on a comparable basis[2].

[1] The detail figures from the China Tourism Academy (Data Center of the Ministry of Culture and Tourism), see the website: http://www.ctaweb.org.cn

[2] Same as the above.

Thus, it demonstrates, even more, the tourism industry's rapid rebound compared to other economies. China's data are gaining more attention as the Chinese economy develops rapidly and the country's international standing continues to rise.

The tourism satellite account (TSA) has been recognized internationally as a standard framework for measuring tourism from the economic point of view and for defining and analyzing the tourism industry in a given country (Frechtling, 1999; Frechtling, 2010; Libreros, Massieu, & Meis, 2006). Besides, the United Nations Statistics Division(UN), the European Communities' Statistical Office (EU), the Organization for Economic Co-operation and Development (OECD), and the United Nations World Tourism Organization (UNWTO) collaborated to publish Tourism Satellite Account: Recommended Methodological Framework[3] (herein referred to as TSA: RFM), which provides general guidance. Following TSA: RMF, almost 60 nations have prepared national or regional TSA to quantify the economic impact of tourism (UNWTO, 2010).

For many years, the Chinese tourism industry has placed a premium on the research of Gross Tourism Revenue, using the term "Gross Tourism Revenue as a proportion of GDP" to describe the industry's position and significant contribution to the national economy. Some researchers have argued that Gross Tourism Revenue is a measure of gross output and does not accurately reflect tourism's economic contribution to the national economy (J.-F. Li & Li, 1999). Y.-L. Ma (2011) pointed out that Gross Tourism Revenue is a total production metric, not a value-added metric, and hence does not constitute a component of the country's GDP to which it belongs. However, due to the inadequacy of China's tourism statistics system, gross tourism income remains the primary statistical indicator for

[3] First edition published in 2000,which referred to as TSA:RFM2000,and then updated in 2008, which referred to as TSA:RFM2008

understanding tourism's macro development. Since tourism is a broader industry, its industrial borders are blurred, resulting in the present Chinese tourism statistics focusing exclusively on the directly relevant parts of tourism. In comparison, the real production of tourism-related sectors that are not directly tied to tourism is rarely represented in tourism statistics. Previously, the tourism industry did not include the output indicators of several tourism-related industries such as culture, commerce, leisure, entertainment, communication, transportation, manufacturing, and finance. These factors contribute to the tourism industry's total production scale being limited, which does not accurately reflect the industry's full scope and the driving influence in general.

At the end of 2015, the National Bureau of Statistics (NBS) stated for the first time that tourism and related industries added value is 2.7524 trillion yuan, or 4.33 percent of GDP, an increase of 0.13 percentage point over the previous year. However, the national tourism administration[4] recently issued the *China tourism statistics bulletin 2014*, which indicated that total tourism revenue was 3.73 trillion yuan in 2014; the tourism industry's overall contribution to GDP was 6.61 trillion yuan or 10.39 percent GDP. These two sets of figures are diametrically different—these two administrations are both authoritative bodies in China, exerting a significant influence on research(X.-F. Dai, 2016). Simultaneously, the present tourism industry is accelerating its growth, and the need for tourism data from the government, society, businesses, and the public is likewise diversified and dynamic. This instance is critical to building a complete, appropriate, and scientific data system for grand tourism. TSA is without a doubt the superior approach for generating scientifically valid and accurate data.

[4] Now is Ministry of culture and tourism of the People's Republic of China.

Regardless of whether the TSA is successfully used, these statistical/accounting instruments must be continuously updated to reflect the changing economic realities of the phenomenon being measured and to respond to new user needs. For years, requests have been made to expand or modify the TSA for regional usage to satisfy the growing demand for such assistance at the subnational level worldwide(TSA:RFM, 2008). Not only was Canada the first country to establish a national TSA, but it also developed a number of regional tourist satellite account (RTSA), and Australia has a somewhat developed RTSA system. China's research of TSA began locally, with several provinces and localities making significant efforts. For example, Jiangsu and Xiamen. However, because creating a TSA is a complicated procedure that needs substantial human and financial resources, these provincial TSAs have remained one-off accounts that have not been pursued further. TSA cannot be established without first reforming the tourism statistics system, which is not an easy feat for any country. Because there is now no standardized guideline for regional tourist satellite accounts, it becomes worthwhile to actively research the construction of RTSA in China utilizing existing data.

This thesis examines the compilation of RTSA in this context, utilizing the fundamental concepts of national economic accounting, the statistics system, and TSA. Additionally, using Shandong province as a case study, attempt to investigate the compilation and calculation of RTSA in China.

## 1.2 Research Purpose

Establishing a TSA is a lengthy process, and it is more realistic to begin with an RTSA and then learn from and promote the experience in the context of China's current position.

In China, establishing an RTSA and gradually pushing it improves provincial tourism statistics and provides a better database for the national TSA, which facilitates its preparation.

Thus, the purpose of this thesis is to examine China's RTSA approach through an examination of the international standard for TSA and related research findings, as well as through the use of current statistics to simplify the calculation of tourism value-added and the creation of an input-output table that includes tourism characteristic industries.

Second, it is adhering to TSA compilation requirements and applying fundamental principles of national economic accounting, delving deeply into the fundamental theoretical system, analytical framework, compilation and expansion difficulties of RTSA contents, and practically compiling various contents of Shandong tourism satellite account (SDTSA) in 2012 and 2017. It facilitates research on tourism's contribution to the provincial economy and industrial linkages in each region, elucidating tourism's critical role in the region's economy and its effect on other industries, and then providing a reliable foundation for developing tourism strategies. It contributes to enriching the relevant topics of RTSA and national economic accounting in both theory and practice, which is a pioneering achievement in China.

Thirdly, after introducing China's tourism statistics system and the development of RTSA in China, this thesis compared the existing Shandong tourism satellite account 2008 [5](SDTSA 2008) to the Queensland tourism satellite account[6] (QDTSA). At the same time, it analyzed the process of calculating Shandong's tourism contribution in 2012 and 2017.

[5] The detail information about Shandong tourism satellite account 2008 will be presented in Chapter 3.

[6] The detail information about Queensland tourism satellite account will be presented in Chapter 3

Therefore, it clarifies the issues and makes recommendations for furthering RTSA analysis in China at this stage.

As a result, the study conducted in this thesis is significant in terms of theoretical research and practical application.

## 1.3 Research Methodology and Innovation

### 1.3.1 Research Methodology

The overall research idea of this paper is based on TSA: RFM 2008, combined with input-output tables, and from the actual situation of China's tourism statistics system, to explore how to establish RTSA suitable for the characteristics of China's tourism economy and national economic accounting, and then to conduct an empirical study with Shandong Province as the object.

Since there has been no unified guiding standard for RTSA, both research materials and compilation methods are confusing. Therefore, this study starts with a theoretical study of the system of national account (SNA) and the statistics system on which the TSA is based, especially a brief description of China's national economic accounting and China's tourism statistics system. The differences between them and international standards are pointed out.

Then, based on the available literature, the actual compilation of national TSA and RTSA in China and other countries and their experiences are summarized. And the SDTSA 2008 and QDTSA are compared, pointing out the similarities and differences in their concepts, compilation methods, and tables.

Secondly, concerning TSA: RFM 2008 and the actual situation of tourism statistics in China, the input-output tables of Shandong Province in 2012 and 2017 are taken as the primary data sources, and the data are processed and integrated to produce input-output tables of 43 sectors, including tourism characteristic industries, and calculate relevant indicators to make a more comprehensive, scientific and objective quantitative analysis of the industrial association and national economic contribution of tourism activities in Shandong Province.

Thirdly, to better understand Shandong's tourism, this thesis employs open-ended interviews in which the respondent expresses his or her opinion freely (See appendix). And in order to obtain an unreleased document on Shandong's input-output table for 2017, the author conducted a field survey at the Shandong Bureau of Statistics in Jinan. However, it is illegal to include the original paper in this thesis without authorization.

### 1.3.2 Research Innovation

The innovation points of this paper are mainly in four aspects.

1) So far, the Regional Tourism Satellite Account (RTSA) is still in the research stage. Different from the national tourism satellite accounts, RTSA still has no unified methodological framework. Therefore, Chapter 3 firstly analyzes and studies the compilation experience of RTSA in China and other countries. And then, comparing China's RTSA with other countries' RTSA, using the existing SDTSA2008 and QDTSA in Australia were compared in basic concepts, compilation methods, etc., and the similarities and differences were summarized, and the deficient of the Shandong tourism satellite account were concluded.

2) In Chapter 4, the direct TVA and indirect TVA of Shandong province in 2012 and 2017 are calculated using China's national economic accounting system, and an attempt is made to simplify the RTSA compilation technique by utilizing existing data. It is the most recent research on Shandong's tourism economy to date. The outcomes become the main results in Tables 4, 5, and 6 of RTSA.

3) Combining TSA and I-O table to investigate the localized compilation of RTSA in China and provide new ideas for global RTSA compilation. The tourism characteristic industries matching the I-O table are selected as the study object based on the TSA concept and *China's Industrial Classification for National Economic Activities (GB/T 4754-2017)*[7], *The Statistical Classification of China Tourism Industries and Related Industries 2018*[8], and *SDTSA2008*. After a number of data processing steps, the Shandong I-O table[9] comprising 43 sectors is generated, including the tourism characteristic industries. The I-O analysis was used to examine the link between tourism characteristic industries and other industries using backward-off, front correlation, inductivity, and influence coefficient analysis.

4) Combined with big data, the application of big data in tourism statistics is summarized. The improvement of tourism statistics by big data is beneficial to the creation of RTSA.

[7] 国民经济行业分类

[8] 国家旅游及相关产业统计分类

[9] The original I-O table comprises 42 sectors

## 1. 4 Structure of the Thesis

This thesis is divided into six chapters. Chapter one discusses the research background, the research purpose, the research methodology, the research structure, and the research innovation points. The second chapter discusses the fundamental theory of the system of national accounts (SNA), China's System of National Accounts (CSNA), tourism statistics, and China's tourism statistics system in depth. It introduced the development and fundamental theory of TSA in particular. Chapter 3 examines regional tourism satellite accounts, analyzing the status of regional tourism satellite accounts in China and other countries and comparing SDTSA 2008 and QDTSA, highlighting the similarities and differences in their concepts, tables, and compilation. Chapter 4 combines the TSA and I-O tables to simplify the process for calculating RTSA and estimates Shandong Province's direct and indirect TVA in 2012 and 2017.

Additionally, it analyzes the link between tourism's characteristic industries and other industries using the I-O table. Chapter 5 highlights the issues of China's RTSA from three perspectives of China's tourism statistics, data, and compilation and makes pertinent recommendations based on big data. Finally, chapter 6 highlights the paper's major conclusions, weaknesses, and areas for future study.

# Chapter 2 Theoretical framework and literature review

## 2.1 Theoretical Framework

### 2.1.1 The System of National Account and Satellite account

The system of national accounts (SNA) is the internationally agreed standard set of recommendations on how to compile economic activity measures according to strict accounting conventions based on economic principles (System of National Accounts 2008, 2009). The satellite accounts are derived from the 1993 System of National Accounts (SNA93). In 2009, SNA2008 has published. Compared with SNA1993, it concluded the changes from 5 aspects(Jiang, Liu, & Wang, 2013), Changes in asset and capital formation, such as the introduction of the concept of intellectual property products; and changes in financial instruments and the financial sector, such as the refinement of the method for assessing financial intermediation services indirectly measured (FISIM). Changes resulting from globalization: for example, the processing of remittances made by international immigrants; changes affect the government and public sectors, such as clarifying the boundaries between the government and public sector and other departments. Additionally, a new chapter in SNA(2008) discusses how to quantify the informal economy and non-observed economy.

In contrast to market economy countries, China's national accounting system has evolved through three phases since 1949: the first stage occurred from 1952 to 1984. A highly centralized planned economic system characterizes this era (Xu, 2014). To meet the

needs of this kind of economic management, it took the system of material product system[10] (MPS), which originated from the former Soviet Union. This system's core indicator is the net output value created by the agriculture sector, industry sector, construction sector, transportation sector, and business sector—the national income. During this period, it did not reflect the production activity of non-material service industries.

The second stage runs from 1985 to 1992, and is characterized by the transition from a highly centralized planned economy to a socialist market economy (Jiang et al., 2013). The non-material service industries, such as Finance and Insurance, Real Estate, Education, and so on, quickly developed. To adapt to the transition, China took advantage of a hybrid system of national accounts. The core indicator included the national income in the MPS system and the gross domestic product (GDP) in SNA. This hybrid system has broken the limit of material production and reflects immaterial service activities' added value. To fill out the gap of data sources needed for estimating value-added in service industries, the NBS conducted the first Tertiary Industry Census in 1991 and 1992.

The third stage spans the years 1993 to the present. During this period, China implements a socialist market economy. It progressively transitions to the SNA. As a result,

[10]According to the MPS, only the material sector is engaged in productive activities that generate national income. The non-material sector does not engage in productive activities and does not generate national income. The material sector includes agriculture, industry, construction, transportation, post and telecommunications, and commercial catering. Among them, agriculture, industry, and construction industry are the production sectors of material products, transportation, post, and telecommunications industry and commercial catering industry are the production sectors of material services. The non-material, although not directly producing material products, transferring material products from producer to consumer, delivered the goods to consumers, make to be able to realize the value of material goods, increase the value of material goods in the circulation process, together with the agriculture, industry, construction industry in the reproduction of social products, together create national income.

GDP has evolved into the primary economic indicator. China's System of National Accounts 2002 (CSNA 2002) is a significant document from this era, based on the SNA 1993. (Xu, 2014). This system indicates that China's national economic accounting has successfully transitioned to the international standards adopted by market economy countries.

The main framework of CSNA is composed of three components: basic accounting tables, national economic accounts, and subsidiary tables (see figure 3). GDP tables, input-output accounting, the flow of funds tables, the balance of payments tables, and balance sheets are all examples of basic accounting tables. In addition, domestic institutional sector accounts, foreign institutional sector accounts, and subsidiary tables comprise the national-economic accounts(Hu, 2015).

While China's existing national accounting data are mostly consistent with the SNA, there are significant incompatibilities. Due to historical reasons, China faces significant difficulties and impediments in adopting the OECD's data release plan, including classification, valuation, information consolidation, constant price accounting, and asset and liability accounting (H. Zhao, 2011). The classification entails classifying industrial sectors, institutional sectors, and product items (Jie Li, 2007). Valuation entails determining the basic price, the Chinese producer price, revaluation, and holding income. Information consolidation is used to describe transactions between institutional departments or between institutional departments and sub-institutional departments; constant price accounting is used to describe the international comparability of accounting methods and formulas. Finally, accounting assets and liabilities are the perfection of accounting tangible and financial assets and liabilities. Numerous Chinese academics have also highlighted the distinctions that impede the formation of TSA (Kang, 2011), but have

not specified where the difficulties are. The paper discusses the primary challenges associated with constructing TSA, which are classification and valuation.

(1) Valuation

China calculates value added by department using "Chinese Producer Prices," whereas the OECD evaluates all value-added by departments at base prices. Other product taxes and non-deductible value-added taxes are included in "Chinese Producer Prices" (VAT). The producer price in SNA excludes non-deductible VAT and includes only other product taxes. As a result, "Chinese producer pricing" has a greater statistical range than the SNA standard. China's current TSAs use producer prices, making direct comparisons with TSA outcomes derived using basic prices in other developed countries difficult (the United States, Canada, etc.). However, each country's accounting system is unique, such as New Zealand's TSA, which likewise employs producer prices.

(2) Industrial classification

The current statistics in China are based on the survey of enterprises, so it is not possible to classify them according to industrial sectors(Jie Li, 2007). NBS

began using the new National Economic *Classification GB/T 4754-2002* in 2004 and divided the industrial sectors into three groups. The situation is as follows,

**Primary Industry:** Agriculture, Forestry, Animal Husbandry, and Fishery

**Secondary Industry:** A: Industry

B: Building

**Tertiary Industry:**

A: Transportation, warehousing, and postal services

B: Information transmission, computer services, and software;

C: Wholesale and retail;

D: Accommodation and catering;

E: Financial Industry;

F: Real estate;

G: Leasing and business services:

H: Scientific research, technical services, and geological survey;

I: Water conservancy, environment, and public facilities management industry;

J: Residential services and other services;

K: Education

L: Culture, sports, and entertainment:

M: Public administration and social organization;

N: Health, social security, and social welfare;

While according to the OECD database, the catering industry needs to be taken out and put into other service industries(H. Zhao, 2011).

CSNA 2002, in contrast to SNA 1993, does not define personal consumption on goods and services, public consumption services, or physical transfer; it also does not define actual final consumption, focusing exclusively on final consumption expenditure. These distinctions will complicate TSA preparations in China(Jie Li, 2007).

For tourism industry，in 2018, to accelerate the tourism development and to define the scope of statistics scientifically in tourism and related industries, based on *The statistics law of the People's Republic of China*, *Several Opinions of the State Council on Promoting the Reform and Development of the Tourism Industry*, regarding *National Economy Classification* (GB/T 4754-2017), the government formulated the classification of the tourism industry.

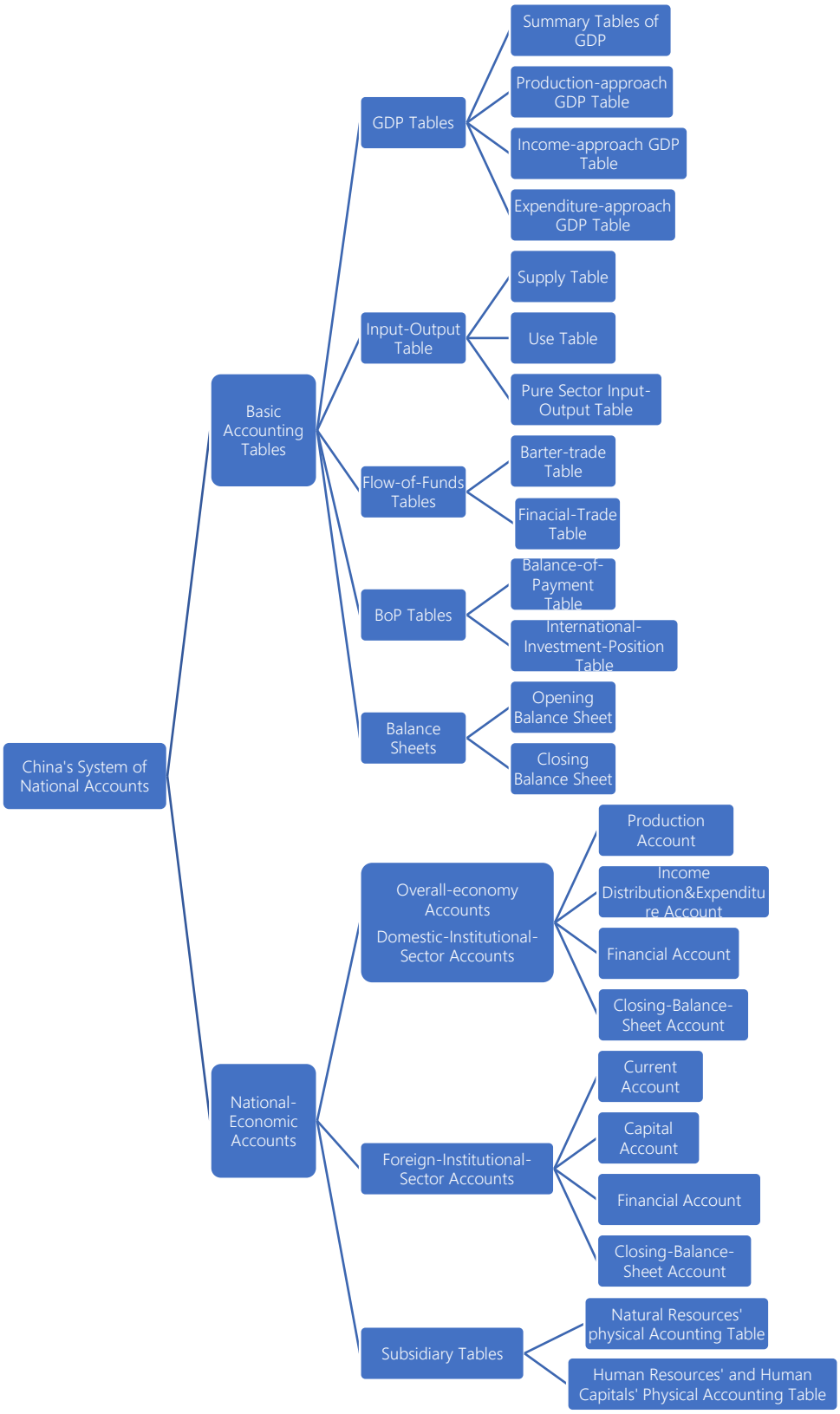


Figure 3. China National Economic Accounting System

### 2.1.2 SNA and Satellite Account

According to the System of National Accounts 1993 (1993), satellite accounts are, on the one hand, linked with the central framework of national accounts ( as well be spelled out at several points in the chapter) and through them to the main body of integrated economic statistics. On the other hand, as they are more specific to a given field or topic, they are also linked to the information system specific to this field. They also call for better integration of monetary and physical data. Because they preserve close connections with the central accounts, they facilitate analyses of specific areas in the context of macroeconomic accounts and analyses. Satellite accounts in various fields may, in addition, help to connect analyses between some of those fields. Thus, satellite accounts can play a dual role as tools for analyses and statistical coordination. A Satellite Account is an extension of a System of National Accounts (SNA), which enables an understanding of the size and role of economic activity, usually 'hidden' with such accounts.

For example, an SNA will not distinguish between a tourist or a resident's newspaper purchase.

SNA93, Para 21.4 states satellite accounts allow for:

(a) The provision of additional information on particular social concerns of a functional or cross-sector nature;

(b) The use of complementary or alternative concepts, including the use of complementary and alternative classifications and accounting frameworks, when needed to introduce additional dimensions to the conceptual framework of national accounts;

(c) Extended coverage of costs and benefits of human activities;

(d) Further analysis of data using relevant indicators and aggregates;

(e) Linkage of physical data sources and analysis to the monetary accounting system.

In 2009, the EU[11], IMF[12], OECD[13], UN[14], and Word Bank released SNA2008. One of the critical changes in SNA2008 and SNA1993 was the comprehensive introduction of the "Satellite Account," which changed the expression of "Satellite Account" in SNA1993. It included the satellite account developed after SNA1993 into SNA2008 and had the Balance of Payments, International accounts, and Fiscal government statistics; monetary and financial statistics are regarded as a form of satellite account. It is an upgrade of the role and status of the satellite account and an image summary of the interaction, complement, and indispensable relationship between the satellite account and the central framework. Due to different statistical bases and different levels of economic development in different countries, the degree of implementation of national economic accounts may be different, and the compilation of satellite accounts may also be postponed. However, this is not the reason to deny the satellite accounts an essential part of national economic accounts.

From the perspective of the preparation of TSA and other satellite accounts, common points of the satellite account are as follows(Jie Li & Li, 2011; M.-Y. Li, 2008):

(1) Satellite accounts generally adopt unique concepts, products, industry classification systems, tabulating methods, etc. For example, the preparation method of TSA and the concept of tourism characteristic products and tourism characteristic activities. In addition, the I-O table for satellite account has been adjusted in terms of terminology to be suitable for analysis of characteristic activities and characteristic products;

(2) Pay attention to both value index and physical index;

---

[11] Commission of the European Communities
[12] International Monetary Fund
[13] Organization for Economic Co-operation and Development
[14] United Nations

(3) There are both conformance and inconsistency with the principles of the central framework;

(4) It has its unique statistical index system, such as the Tourism value added in the TSA, tourism final consumption, etc.

Unlike the central framework, satellite accounts have the following characteristics:

1.Take a given industry or field as a whole to assure the completeness of industry or field statistics. For instance, the health satellite account's study object is the entire medical and health industry. It encompasses not only the supply of medical and health industry services (the tertiary Industry) but also the manufacturing and marketing of physical products of the medical and health Industry (the secondary Industry), as well as the manufacture of raw materials (the primary Industry). As a result, the Health satellite account concept encompasses comprehensive medical and health sector statistics. Due to the fact that the satellite account examines a single industry or field and considers the comprehensiveness and integrity of industry statistics, there will invariably be double calculation from the perspective of the entire national economy. As a result, none of the satellite accounts equals the entire national economic account.

2. The scope of production can be expanded in accordance with the core framework. Once the product scope is established, the statistical content of each industry must be counted carefully within the product scope bounds to maintain consistency with the central framework's product scope. At the same time, satellite accounts can be restricted to the extent of production covered by the core framework or expanded. Therefore, the satellite account can be divided into two categories according to the consistency with the production scope of the central framework. One is an internal satellite account, and the other is an external satellite account. The scope and accounting rules for internal satellite accounts are

the same as the central framework—for example, the tourism satellite account, environmental protection expenditure satellite account, etc. There will be some changes in the scope or accounting rules for external satellite accounts.

3. It complements the central framework and facilitates the analysis of problems in a particular domain. The central framework has rigor and integrity in the system, and the whole account sequence is complete. To ensure the central framework's integrity, it is not possible to incorporate all the details of all the activities of all departments into the central framework, which would complicate the system and weaken the overall performance of the accounts. To solve this problem, the satellite account was introduced, which complements the central framework.

4.The focus remains on production. The most direct measure of industry development is the production result, so the satellite account still focuses on measuring production scale and level, even if the same unit of measurement can be extended from "value indicator" to "physical indicator." As far as the relationship between the satellite account and the central framework is concerned, the satellite account is not aimed at covering the entire economic life but only a framework of local self-unification.

### 2.1.3 Tourism Statistics

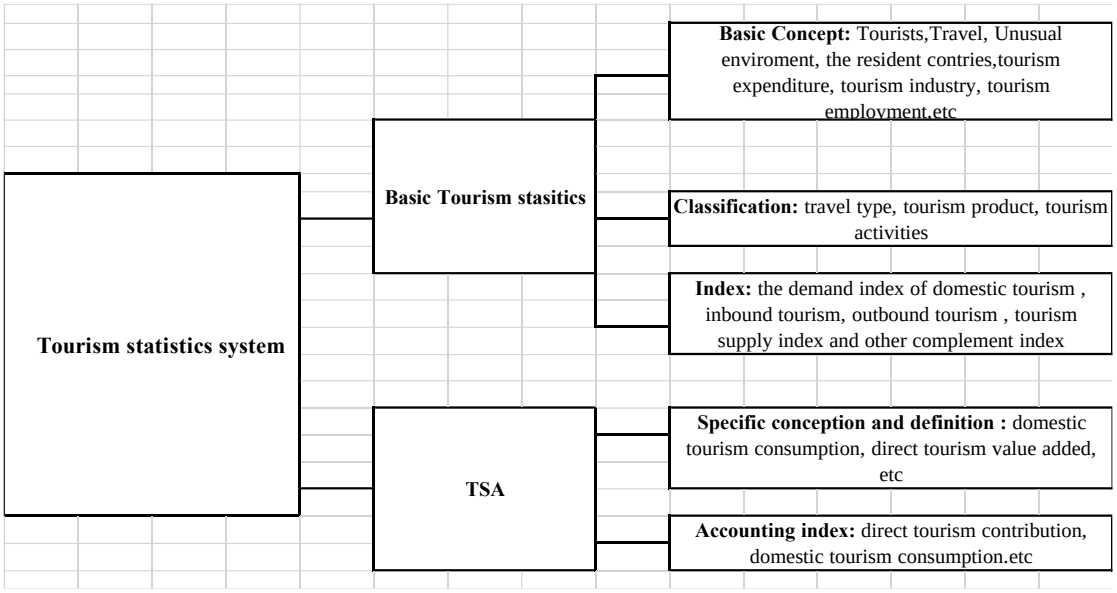


Figure 4: Tourism statistics system

### 2.1.4 China's Tourism Statistics System

Before introducing China's tourism statistics system, this paper will present the 70-year development history of China's tourism industry. Based on the political economy of tourism in China, according to the economic and social evolution of New China, and combined with the stage characteristics of tourism development, this paper divides the development course of tourism of New China in the past 70 years into two periods and four stages(Cheng, Yang, Liu, & Xiong, 2020). During the first period, from the establishment of New China to the period preceding the reform and opening up (1949–1978), tourism's primary objective was international reception, political influence expansion, and showcasing China's construction successes. The post-reform and opening-up phase (from

1978 to 2019) is classified into four segments. Tourism successfully transitioned from foreign affairs reception to economic construction during the first stage (1978–1984). The second stage (1984–1992) identified the function shift from business management to a market economy; the third stage (1992–2009) identified the concept shift from tourism products to the tourism industry. Fourth stage (2009–present), the idea of transitioning from economic industries to service to the public purpose has been realized.

Among them, China's tourism statistics began in the early 1980s(Chang, Kang, & Kuang, 2005). The national tourism administration[15] is trying to establish a domestic tourism statistics system based on the statistical reports of domestic travel agencies. However，it failed to carry out fully because the proportion of domestic tourists received through travel agents was too little to reflect the true extent of the domestic tourism industry and lacked representativeness. Additionally, several provinces and municipalities summarize data reports from hotels（restaurants）to depict the domestic tourist situation on a local level. Since 1993, the NBS' Urban Social-Economic Survey Corps has conducted a sample survey of urban residents' travel to compute the national domestic tourist population (J. Wang, 2008). Since 1995, some provinces and cities have also conducted sample surveys of domestic tourists according to the needs of the region's socio-economic development, especially the development of tourism, and many valuable experiences have been gained. Ye (2003) states that according to the national tourism administration, there were eight kinds of sampling survey methods in 14 provinces and cities before 1997. In 1997, the government also conducted a sampling survey of rural residents' travel. While calculating the scale of national domestic visitors using the "travel rate" of urban and rural

[15] Now is Ministry of culture and tourism of the people's republic of China

inhabitants is somewhat scientific, it does not account for local perceptions of the status of domestic tourists in various provinces and cities. In 1999, the National Tourism Administration and the NBS jointly issued the "*Implementation plan of sampling survey on local reception of domestic tourists*[16]" to promote and standardize the sampling survey of domestic tourism to survey domestic tourists more unified blueprint.

Tourism statistics are an essential part of sectoral statistics. And the current '*Statistical system for tourism statistics*[17]' was approved and adopted by the NBS in November 2017, which contains three parts: tourism regular reporting system, tourism sample survey, and tourism special survey. According to the 'Statistical system for tourism statistics (2017),' the national Ministry of Culture and Tourism, in collaboration with provincial culture and tourism departments, compiles statistics on travel agencies, star-rated hotels, tourist attractions, tourism colleges, and tourism staff education and training. Additionally, several forms of grass-roots statistical units are filled out in various statistical survey systems. On the one hand, the Marketing Division and Resource Development Division compile statistics on the domestic tourist market by collecting data from over 40,000 tourism enterprises (travel agencies, hotels, and scenic spots) around the country. On the other hand, the National Bureau of Statistics' Social Opinion Research Center is tasked with selecting 40,000 urban and rural samples each year using telephone questionnaires to elicit data on the number of trips taken by urban and rural residents, per capita tourism expenditure and composition and travel types(Q. Li, 2012). Additionally, the study serves as a basis for future projections of domestic visitor numbers, travel rates, and total travel spending. On the other hand, the inbound tourism sample survey chooses

[16] 地方接待国内游客抽样调查实施方案

[17] 旅游统计调查体系

roughly 50,000 inbound travelers to perform questionnaire surveys to obtain specific information on the duration of stay, tourism expenditure composition, and tourist flow each year. Outbound tourist statistics are mostly based on data from the National Immigration Administration [18](Cao & Jiang, 2020). As a result, it may deduce the length of stay, mode of travel, the composition of tourism expenditure, and other data about mainland Chinese people who travel abroad.

In general, China has gradually established a set of tourism statistics systems with sample surveys and enterprise reports as the main body (B. Dai, 2017). The first source of annual tourism statistics bulletin data is to form tourism market data through sampling surveys and comprehensive calculation of essential data from the Ministry of Public Security. The second source is directly obtained from tourism enterprise data. The third source is to calculate the comprehensive contribution data of tourism through the tourism satellite account and the input-output method. The number of individual tourists is not explicitly counted but is introduced through a sample survey comprehensive measurement of domestic tourism. The projection through sample surveys has proven to be a reliable way. As for family visitation, according to the IRTS 2008 and China's '*Statistical system for tourism statistics,*' in line with the caliber of tourism, that is, travel 10 kilometers, stay more than 6 hours to visit family and friend activities, are included in tourism statistics. Rural tourism belongs to unique tourism statistics, which have not been included in the statistics system. Tourism statistics are an important component of the government department, and its purpose is to serve the government's decision-making. The Chinese statistics system is constructed according to the methodology of the UN(B. Dai, 2017). The establishment of the

[18] Previously the Ministry of Public Security's Exit and Entry Administration

National Tourism Administration Data Center is an important symbol of the progress of tourism statistics in the history of China's tourism statistics.

The whole statistics system consists of five parts: The first part is the market statistics of domestic tourism, inbound tourism, and outbound tourism, reflecting the market size and development with the sample survey. The second part is the tourism industry statistics, reflecting the growth and operation status of characteristic business forms based on enterprise statements. The third part is the statistical system of tourism reception, reflecting the regulations and benefits of local tourism development. The fourth part is about the Spring Festival and National Day holiday tourism statistics based on the data of provincial direct reports. The fifth part, special tourism statistics. As shown in Table 1.

**Table 1. China's tourism statistics system**

| Statistical item | Main index | Data collection and formation |
|---|---|---|
| Three major tourism market statistics | Number of inbound tourists, Number of overnight visitors, and International tourism income by foreigners, compatriots in Hong Kong, Macao, and Taiwan, 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 | Sampling survey (Divisional report) |
| Travel agency scale, Star-rated hotel 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,The number of star-rated hotels, rooms, beds, original fixed assets and operating income | Enterprise reporting (Grass-roots statistical report) |
| Local tourism reception statistics | Inbound tourism, domestic tourism | Local statistics |
| Tourism statistics of Spring Festival and National Day | The number of tourists, tourism consumption composition | Statistics by the provinces, big data calculation |
| Tourism education and training statistics | The number of tourism universities and colleges and the number of students in the country | Statistics by the provinces (Professional report) |

Source: The yearbook of China's tourism and statistical system for tourism statistics, edited by the author.

For a long time, China's tourism statistics have implemented different statistics systems and methods between the national and local levels. From the national level, inbound tourism data are measured by the number of arrivals at national ports of entry, combined with sampling surveys. And domestic tourists are projected by taking surveys of residents' trips, and the same method is used for tourism statistics during the golden week. From the provincial level, the number of overseas and domestic overnight visitors is measured by the accommodation facilities method. And the number of domestic one-day visitors is measured by the scenic spots method. It does not require the national data equal to the sum of data from all provinces, autonomous regions, and municipalities.

For example, in Sichuan Province and Guangxi Autonomous Region, based on the traditional accommodation facilities statistics method, staying in the homes of friends and relatives is included in the number of overnight visitors. In Shandong Province, the number of tourists provided by the public security department is the low line. The signal data provided by the three major operators of China Telecom, China Mobile, and China Unicom that had been away from their original location for more than two hours were taken as the high line. The number of out-of-town license plates recorded at the expressway exit was taken as the reference to evaluate the reported data. As long as the data within this range and provide the necessary sample survey basis are accepted.

It was not until July 1, 2015, that the 10th executive meeting of the National Bureau of Statistics adopted the *National Statistical Classification of Tourism and Related Industries (2015)*, a critical step towards the inclusion of the tourism industry in the national economic statistical system. The *National Statistical Classification of Tourism and Related Industries (2015)* is a milestone in China's history of tourism development. The promulgation and implementation of this standard will truly give tourism a position in the

national economic system. Scientific methods with legal status will measure the actual contribution of tourism to the national economy. The actual contribution of tourism to the national economy will be measured by scientific methods with legal status and will be fully reflected in the national economic statistics system. The most critical thing is that society will also form a consensus on the role of tourism in socio-economic development. Of course, from the content of this standard, there are still areas that need further improvement. After a practice period, tourism classification and statistics standards will be further improved and more comprehensive and scientific.

Compared with the internationally comparable tourism statistics system recommended by the World Tourism Organization (Table 2), China's System of tourism statistics indicators still has some problems and will be analyzed in Chapter 5.

**Table 2. The comparison of International standard and China's tourism statistics**

| Items | | International standard | China's tourism statistics |
|---|---|---|---|
| Conception | Basic concept | Tourists,tourism,usual environment,etc | Tourists,tourism,usual environment,etc |
| | Core conception | Domestic tourism consumption, tourism value-added, tourism employment | Number of tourists, tourism revenue |
| Classification | | classification of tourism products and industry | National Tourism and Related Industries Statistical Class |
| Tourism demand accounting | | Visitor final consumption expenditure in cash and kind, tourism social transfers in kind ,tourism business expenses | Visitor final consumption expenditure in cash |
| Tourism suppy accounting | | The composition and tourism value added of the tourism | The relevant index of travel agency, star-hotel and other |
| Core index of tourism statistics | | Visitor final consumption expenditure, tourism value-added and its composition, tourism employment, etc. | Visitor final consumption expenditure in cash and operating index of travel agency,star-hotel and part of the tourism industry |

Source: Edited according to Y. Li and Li (2012)

## 2.2 Literature review of Tourism Satellite Account

### 2.2.1 The development of TSA

In 1937, the Committee of Statistics Experts of the League of Nations recommended a definition of "international tourist." In 1953, the UN Statistical Commission (UNSC) established the "international tourist" (Huang, Liang, & Zhao, 2009). Tourism statistics and measurements date back to the 1930s. Since tourism statistics do not appear to have kept pace with developments, it is difficult to give more comprehensive information on the type, progress, and outcomes of tourism operations systematically. Even more reliable data on the contribution of tourism to the national economy and the size and importance of the tourism industry are limited. The first to recognize that this theoretical approach to accounting fell behind economic development were French economists and statisticians. And in the late 1970s, they began experimenting with the idea of developing a subsystem based on the fundamental concepts of the System of National Accounts (SNA), but with a greater emphasis on tourism-specific characteristics - the Tourism Satellite Account (TSA). Following the 1980s, economists and statisticians in various countries progressively realized and began to investigate the relevance of tourism and other economic and social activities. According to the TSA research process, TSA and methodological research development are separated into three stages: conceptual development, exploration, integration and deepening. (Ge, 2007).

(1) Conceptual development stage (1970s-1980s)

Grimm (1991) described France as the first country to develop "satellite accounts" based on the SNA in the 1960s to analyze the housing sector. In 1963, the UN Conference

on International Tourism and Travel was held in Rome. The UNSC approved the concepts and definitions of "tourist," "visitor," and "same-day visitor" recommended by this conference in 1968. In 1978, the UNSC adopted the *Provisional Guidelines on International Tourism*, recognizing the importance of the interdependence of tourism with other economic and social activities. UNWTO published fundamental recommendations for the harmonization of tourism concepts and statistical methods in 1983. Tourism statistics harmonization began with modifying current tourism definitions and classifications to reconcile them with those used in other important national and international statistical areas(Smith & Wilton, 1997). At the same time, research on the integration of tourism into the System of National Accounts (SNA) continued to progress (Frechtling, 1999). In 1984, Canada began work on the TSA concept. In 1985, Sweden designed a set of TSA, but it was limited to the supply side of tourism (Nordström, 1996).

(2) Exploration stage (the 1990s)

In 1991, the UNWTO held the International Conference on Travel and Tourism Statistics in Ottawa, the capital of Canada, which was the first time to seek a consensus on tourism statistics in the international scope (Frechtling, 1991). The UNWTO defines domestic and international tourism statistics and classification methods related to other international statistics. The internationally accepted definition of "tourism" must meet the following criteria: 1. It's universal. 2. Definitions are straightforward. 3. Targeted strictly to meet statistical needs. 4. Consistent with existing international standards and classifications. In 1993, the UN, the IMF, the World Bank jointly other international organizations adopted SNA93. It also recommended that industries not represented or fully represented in traditional statistical systems use satellite accounts based on function. In the same year, the Ottawa and the UNWTO's *Standard International Classification of Tourism*

*Activities* as provisional classifications to guide countries and recommended that countries use the System of National Accounts (SNA). The TSA is used to measure the impact of tourism development on the economy and employment. UNWTO began to study the establishment of TSA under the framework of SNA93.

In 1994, the UN and the UNWTO jointly issued the Recommendations on Tourism Statistics, which systematically defined the basic concepts in tourism statistics, such as Tourism and tourists, and has been widely spread (UN, 1994). Since then, some of the definitions and classifications have been refined and adjusted by the WTO to be consistent with the principles of the theoretical framework of the TSA. In the same year, Canada launched the world's first national TSA.

3. Integration and deepening stage (after 1999)

The UNWTO published Tourism Satellite Account (TSA): The Conceptual Framework in June 1999 to overview past studies. The UN formally recognized the TSA methodology in 2000. The UNSC endorsed the Tourism Satellite Account: Recommended Methodological Framework (TSA: RFM 2000) at its 31st meeting in March 2000, establishing a standard conceptual framework for countries developing the TSA. The International Conference on TSA was held in Vancouver, Canada, in May 2001. The conference drew over 200 delegates from more than 50 nations. On the one hand, the summit emphasized the importance of improving TSA development in diverse countries. On the other hand, it is necessary to strengthen the analysis, application, and prediction function of TSA and strengthen the efforts to serve the market and enterprises. In February 2002, The UNWTO issued the General Guidelines for National Tourism Administrations for the Development of Tourism Satellite Accounts in Madrid, Spain. The content including (1) TSA: a new approach to understanding the economic impact of tourism; (2) TSA activation; (3) TSA development; (4)

TSA and Tourism Statistics System: supplementary procedures; (5) TSA: the outlook of national tourism authorities, etc. The guidelines further clarify the role of the TSA, the difficulties in its creation, the role of national tourism authorities in creating TSA, and some basic principles for the design of TSA.

The most recent international conference on tourism satellite accounts was held on October 3, 2005, in the Iguazu region, entitled "Tourism satellite accounts: understanding tourism and design strategies. "At the meeting, the new research results of the TSA were released, including the research and practice of the regional tourism satellite account (RTSA). And the latest edition of Travel Satellite Accounts: Recommended Methodological (TSA: RFM) was approved in 2008. All primary manuals and guidelines concerning the TSA are illustrated in Table 3 as follows.

**Table 3. The manuals and guidelines concerning TSA**

<table>
<tr><th></th><th>1983</th><th>1991</th><th>1993</th><th>1994</th><th>1996</th><th>1997</th><th>1999</th><th>2000</th><th>2001</th><th>2008</th></tr>
<tr><td>Eurostat, IMF,OECD,UN and World Bank</td><td></td><td></td><td>System of Nationa Accounts 1993</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Eurostat</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td rowspan="4">Tourism Satellite Account: Recommended Methodological Framework 2000</td><td rowspan="4">Tourism Satellite Account: Recommended Methodological Framework 2008</td></tr>
<tr><td>OECD</td><td></td><td></td><td></td><td></td><td>OECD Tourism Statistics: Design and Application for Policy</td><td>First proposal for TSA</td><td></td><td></td></tr>
<tr><td>UN</td><td></td><td></td><td></td><td rowspan="2">Recommendations on Tourism Statistics</td><td></td><td></td><td></td><td></td></tr>
<tr><td>UNWTO</td><td>Put forward the idea of establishing TSA</td><td>International Conference on Travel and Tourism Statistics</td><td></td><td></td><td></td><td>UNWTO Tourism Satellite Account (TSA):The Conceptual Framework</td><td>Measuring the Role of Tourism in OECD Economies</td></tr>
<tr><td>Canada</td><td></td><td></td><td></td><td>First TSA</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>

Source: According to the reference, which the author edits.

### 2.2.2 What is a Tourism satellite account

According to TSA:RFM 2008, the Tourism Satellite Account consists of analyzing in detail all the aspects of demand for goods and services which might be associated with tourism, in establishing the actual interface with the supply of such goods and services within or outside the economy of reference and in describing how this supply (from domestic or imported origin) interacts with other economic activities, using the supply and use tables as a reference. TSA is a method of measuring the direct economic contributions of tourism consumption to a national economy. Its unique approach derives from employing the principles and structure of the internationally adopted System of National Accounts to measure tourism's direct economic impact. It comprises a unique set of inter-related tables that show the size and distribution of the different forms of tourism consumption in a country and contributions to gross domestic product (GDP), national income, employment, and other macroeconomic measures of a national economy (Frechtling, 2010). These indicators reflect the size and economic significance of tourism.

TSA: RFM2008 states that a complete tourism satellite account will provide

(1) Macroeconomic aggregates such as total tourism consumption, tourism value-added, tourism employment, etc.

(2) Detailed data on tourism consumption, through which industries and how this consumption is met by domestic or regional supply, imports, or interregional inflows; combining them in the I-O tables of the national accounts expressed in SNA93 and examining how these tourism consumptions are linked to supply.

(3) Detailed production accounts for tourism, such as the linkages between tourism activities and other productive economic activities, tourism employment, and to provide a

basis for comparison with other industry data.

(4) The links between economic data on tourism and other non-monetary information, such as the number of visitors, length of stay, the purpose of travel, mode of transportation, etc., are used to characterize economic variables.

The Tourism Satellite Account (TSA) is an UN-approved measure of tourism statistics that adds a tourism dimension to the System of National Accounts (SNA) to measure the size of tourism in a country or region's economy. It can do so because it breaks through the limitations of the traditional tourism statistics system and allows for the integration and balancing of data on both the supply and demand sides.

### 2.2.3 The purpose of TSA

TSA: RMF (2008) notes the TSA purpose is to analyze in detail all the aspects of the demand for goods and services associated with the activity of visitors; to observe the operational interface with the supply of such goods and services within the economy, and describe how this supply interacts with other economic activities. Therefore, a complete TSA could provide a means of separating and examining both tourism supply and tourism demand within the general framework of SNA.

Kang (2011) summarized TSA facilitates the development and improvement of tourism statistics systems. Before creating TSA, tourism statistics in all countries of the world faced almost the same problems. For example, tourism information was scattered, incomplete, and uncoordinated. Moreover, definitions and principles followed by various types of tourism enterprises and administrations differed in their statistics; and the process of collecting tourism information varied greatly from country to country. As a result, the

results of tourism statistics generated by countries differ significantly in scope and degree of accuracy. TSA: RFM, a document that serves as a standard guideline for countries to compile TSA. The introduction of this document clearly states that "the Tourism Satellite Account, as a process of establishment, will guide countries in developing their tourism statistics systems." Thus, the system of tourism statistics built according to this framework will follow uniform concepts, definitions, classifications, accounting principles and include consistent statistical indicators and statistical standards. As satellite accounts, the TSA is aligned with the underlying SNA. This tourism statistics system allows comparing the economic impact of tourism with other economic activities in the national economy. Because the TSA makes the tourism statistics system consistent across countries, the TSA becomes a tool for international comparisons of the economic contribution of tourism. Currently, international comparisons of the economic impact of tourism have been made among countries that have implemented TSA.

M.-Y. Li (2008) introduced one of the important statistical implications of establishing a TSA: creating a versatile database. The primary purpose of the TSA is to bring together disparate information on tourism into an integrated framework that combines data from demand-side surveys in the national statistical system with data from different supply-side enterprise surveys. And the data from both sources form an extensive database. Overall, the TSA provides detailed data on tourism consumption and shows how this consumption is met by domestic supply and imports. It also includes data on employment, linkages with other productive economic activities, and capital formation. Thus, it provides the basic information needed for tourism analysis, including links between economic data and non-monetary information. Specifically, the TSA presents information on all aspects of the tourism industry. Because this database collects a large amount of microeconomic data on

tourism, it plays a fundamental role in tourism analysis, planning, and the development of the TSA itself, such as the publication of regional TSAs and timely national tourism indices.

TSA reflects the specificity of tourism activity and depicts the whole picture of tourism economic activity in the market economy conditions, revealing the scale of tourism and its economic importance (APEC, 2010). TSA can help economists of countries and regions that have adopted the system to explain complex tourism economic phenomena, providing a scientific approach to analyze the relevance of the tourism economy to the overall economy of a country.

The TSA is also an essential tool for the government to understand and monitor the performance of the tourism economy for macroeconomic management purposes. Tourism activity is mainly expressed as a demand phenomenon, but the TSA reflects the importance of tourism in terms of supply and demand, based on a series of tabulations and compilation methods under the principles of national economic accounting. Thus, the TSA provides a mechanism that is a rigorous methodological and conceptual system for identifying how much tourists consume and who produces what for them, i.e., which industries produce the majority of tourism demand; which industries rely heavily on tourism demand or would be severely affected without it. For example, in 1994, the Canadian Tourism Satellite Account revealed the internal structure of the tourism industry for the first time.

A tourism satellite account, whether at the national or regional level, can achieve several objectives.

(1) create meaningful tourism-centric macroeconomic aggregates that can be used to illustrate the size of tourism and its importance, such as tourism value-added and tourism GDP.

(2) Detailed data on tourist consumption and how various types of consumption are met through domestic supply. They are combined in the input-output tables generated in the national accounts in general.

(3) Construction of a tourism economic model and preparing the basic information needed for market-oriented tourism analysis.

(4) Linkage between economic data on tourism and other non-monetary information, such as the number of tourists, length of stay, tourism, mode of transport duration, the purpose of tourism, mode of transportation, etc.

### 2.2.4 TSA tables

Creating a TSA involves filling out ten forms[19]. At the beginning of its establishment, at least partial tables had to be completed to measure the macro-economic benefits of tourism. Table 1, Table 2, Table 3, and Table 4 respectively statistics the inbound tourism consumption, domestic tourism consumption, outbound tourism consumption, and domestic tourism consumption (Buccellato, Webber, & White, 2010). Table 5 shows the production accounts of the tourism industry and other industries; Table 6 shows domestic supply and domestic tourism consumption by product. Table 6 is the core of the TSA. Based on other tables, indicators such as tourism value-added and domestic production components can be calculated through Table 6. With these aggregate economic indicators, a macroeconomic analysis has fundamental and technical critical support. Table 4 shows the information about TSA tables.

[19] See: https://unstats.un.org/unsd/tradekb/Knowledgebase/50553/TSA-RMF-2008

**Table 4. Tourism Satellite Account——The Constituent Tables**

| | TSA Table | Coverage | Notes | Notes |
|---|---|---|---|---|
| Demand | 1 | Inbound tourism expenditure | Part of aggregate demand | |
| | 2 | Domestic tourism expenditure | Part of domestic total consumption | |
| | 3 | Outbound tourism expenditure | Not generally linked to other TSA tables | |
| | 4 | Domestic " tourism final consumption | Synthesised from Table 1%2 | Combining Table 4 and Table 6 to get tourism ratio, and then together with Table 5 to get the TVA. |
| Supply | 5 | Production of tourism commodities | | |
| | 6 | Domestic supply & consumption by product | A reconciliation of Table 4&5, The heart of the TSA | |
| Economic indicator | 7 | Employment & labour use | | |
| | 8 | Tourism Fixed capital formation | Not currently reported | |
| | 9 | Tourism Collective consumption | Not currently reported | |
| | 10 | Non-monetary Indicators | e.g. Tourism volumes/nights;types of tourist etc. | |

Source: Jones, Calvin 2005. Tourism satellite accounts: Progress in Wales and the UK. Welsh Economic Review 17 (1), pp. 20-24. 10.18573/j.2005.10351, edited by the author.

### 2.2.5 The classification of tourism product and industry

The creation of the TSA can be seen as a synthesis or integration of the tourism statistics system as a construction process that guides a country in developing its tourism statistics system. According to the information provided by the UNWTO, the TSA is included in the tourism statistics and is a part of the tourism statistics system, which can be considered an essential subsystem of the tourism statistics system. The TSA has its unique industry and product classification called tourism characteristic activities and tourism characteristic products.

To account for tourism value-added, the TSA first needs to define which services or goods are frequently consumed by tourists, representing a catalog of tourism characteristics products. The tourism characteristic industries are then determined according to the industries that provide these products or services.

Based on TSA: RFM 2008, all products according to their closeness and relevance to the tourist's consumption shown in Table 5.

**Table 5. The classification of tourism product and industry**

| Products | Tourism industries |
|---|---|
| A. Consumption products | |
| A.1. Tourism characteristic products | |
| 1. Accommodation services for visitors | 1. Accommodation services for visitors |
| 1.a. Accommodation services for visitors other than 1.b. | 1.a. Accommodation services for visitors other than 1.b. |
| 1.b. Accommodation services associated with all types of vacation home ownership | 1.b. Accommodation services associated with all types of vacation home ownership |
| 2. Food- and beverage-serving services | 2. Food- and beverage-serving Industry |
| 3. Railway passenger transport services | 3. Railway passenger transport |
| 4. Road passenger transport services | 4. Road passenger transport |
| 5. Water passenger transport services | 5. Water passenger transport |
| 6. Air passenger transport services | 6. Air passenger transport |
| 7. Transport equipment rental services | 7. Transport equipment rental |
| 8. Travel agencies and other reservation services | 8. Travel agencies and other reservation industry |
| 9. Cultural services | 9. Cultural industry |
| 10. Sports and recreational services | 10. Sports and recreational industry |
| 11. Country-specific tourism characteristic goods | 11. Country-specific tourism characteristic goods |
| 12. Country-specific tourism characteristic services | 12. Country-specific tourism characteristic industries |
| A.2. Tourism connected products | |
| A.3. Non-tourism related consumption products | |
| B. Non-consumption products | |
| B.1. Valuables | |
| B.2. Other non-consumption products | |

Source: TSA: RFM2008

## 2.2.6 The relationship of TSA and SNA

SNA93 defines each sector in terms of production. However, tourism cannot be from a production perspective. Tourism-related enterprises, such as travel agencies, hotels,

transportation, restaurants, etc., do not offer the same product and do not produce that product with the same technology. Enterprises whose income is significantly affected by the lack of tourism activity are defined as tourism enterprises. Therefore, tourism products are scattered within different sectors, such as transport enterprises, hotel enterprises, travel agencies. The SNA93 considers the specific situation of tourism. It suggests two ways to measure tourism; one way is to modify the SNA by dividing each industry and product related to tourism into tourism subcategories and then corresponding evaluation. For example, Air passenger transport, railway passenger transport, etc., could be created under the transport industry. The advantage of this approach is that tourism is included in the body of SNA. However, this approach destroys the integrity of the SNA and changes the basic structure of the national accounts.

Another possibility is developing a semi-independent structural framework based on national accounts that explicitly quantifies the tourism industry. The latter strategy is widely regarded as the only feasible one, as it maintains the entirety of the SNA while utilizing relevant data to determine the size of the tourism industry. The latter method is referred to as satellite accounts. In summary, the TSA and National Accounts both use the same data source to determine the size of the tourism industry. The TSA is intended to be used in conjunction with the national accounts. TSA allows for comparisons of the tourism industry to other sectors such as agriculture, construction, and manufacturing. Thus, it is possible to ascertain tourism's precise position within the national economic system.

The TSA requires a methodological approach that follows the traditions and basic principles of the SNA93 and is consistent with the national economic accounting methods of the country of preparation, thus allowing for flexibility and adaptability. In terms of content and essence, TSA is to separate and reorganize data of the existing national

accounting system to meet the needs of tourism analysis. To measure the contribution of tourism to the national economy, TSA follows the idea of the connection between tourism consumption and tourism supply. For final tourism consumption subdivided by tourism characteristic products, multiple national economy industries (i.e., tourism characteristic industries and tourism-related industries) correspond. These tourism consumption expenditures are treated as the output of these sectors. Still, only part of the output of these industries can be attributed to the consumption of tourists, while the rest is directed to non-tourists. For this purpose, the TSA defines the tourism supply ratio of industries, i.e., the proportion of the value of the output of a sector that is attributable to tourist consumption, and applies this ratio to the value-added and the value of tourism employment generated by these industries to accommodate tourism consumption.

TSA is also embedded in a country's overall national accounting. The two share a common conceptual and accounting system so that TSA can be considered special national accounting for tourism. As a whole, the TSA does not change the basic scope of traditional economic accounting, and its primary purpose is to aggregate data under the theme of "tourism." The TSA is consistent with SNA93 in that owner-occupied housing services are still included in its accounting scope. For example, housing services provided by tourists to their second homes are included in the TSA and are counted virtually, thus expanding the range of traditional tourism production accounting. In addition, since TSA describes the overall relationship between the demand for services and goods generated by tourism activities and tourism consumption and their supply, from an economic theory point of view, TSA also describes a supply and demand equilibrium associated with tourism economic activities.

Although the TSA has many things in common with the SNA, there are some differences. The first is the difference in account setup; the TSA does not use a strict four-form entry account mode; it is designed with ten separate tables. Business tourism expenses are the most significant difference between the TSA and SNA93; for example, business tourism is counted as final consumption in the tourism account, but in SNA93, business tourism or tourism business expenses are intermediate consumption. In addition, for the study, TSA redefined product classification and industry classification. The TSA first defines the concepts of Tourism Characteristic Products and Tourism Characteristic Activities. Tourism Characteristic Products (TCP) are those products that, in most countries, would no longer exist in meaningful quantities or at significantly lower levels of consumption in the absence of tourists. The characteristic producer is a concept specific to satellite accounts. According to SNA93, the analysis focuses on characteristic activities and characteristic producers when looking at satellite accounts. Producing characteristic goods and services is called the characteristic activity, and the producer who performs the characteristic activity is the characteristic producer. Thus, tourism characteristic activities (TCA) can be those production activities that produce a primary output with tourism characteristics. Since this group of activities does not include a single industry that meets the definition of SNA93, the Tourism Satellite account defines the tourism industry as all grass-roots units whose main production activity is characteristic of the tourism industry. Based on the clarification of the above concepts, a country or region compiling a TSA needs first to identify tourism characteristic activities and tourism characteristic products.

The Tourism Characteristic Products (TCP) and Tourism Characteristic Activities (TCA) are a reclassification of the product and industry sectors of the national economy, which is different from the Central Product Classification (CPC) and the International

Standard Industrial Classification (ISIC) methods recommended by SNA93. In essence, these concepts or catalogs have defined the boundaries of tourism products, tourism consumption, and tourism production activities in terms of product and industry classifications, which are also the basis for the compilation of TSA tables. Since TCP and TCA are directly related to the scope of accounting for tourism consumption and tourism output, the preparation of the catalog directly affects the scope of accounting for tourism output and the results of each TSA. At the same time, the TSA distinguishes between consumer durables purchased for tourism and the same items purchased for business purposes, but the SNA93 does not. SNA93 considers it part of investment accounting on valuable items, but the TSA classifies it as final tourism consumption. The TSA redefines the I-O tables according to the needs of the study. Although the TSA Table 5 is mainly based on the I-O table of SNA93, it adapts the concepts and classifications related to the breakdown of products and sectors, the breakdown of transaction activities, etc., to the study characteristic activities and characteristics products as defined by the TSA.

### 2.2.7 Problems and limitations of existing tourism satellite accounts

TSA has its drawbacks. In the study of the contribution of tourism, TSA only considers the direct effects of tourism, that is, only those effects of the direct physical and economic links between tourists and producers, and does not consider the indirect and induced links within the economic system caused by tourism consumption or demand. Thus, the analysis and application of TSA have their limitations. It cannot directly show the indirect and induced impacts of tourism. Therefore, TSA also needs to complement other tourism economic impact assessment methods, such as the input-output and computable

general equilibrium methods. In addition, restricted by the basic conceptual system of SNA93, TSA also fails to consider the interaction between tourism activities and resources and the environment. Tourism activities have a very close relationship with resources and the environment. At the same time, due to the limitation of data, the establishment of tourism satellite accounts often has a certain lag.

### 2.2.8 The case of TSA

The world's TSA research is prioritized at the national level, with the compilation of TSA mostly concentrated in developed countries, with a few east Asian or underdeveloped countries also included. The tourism satellite accounts of Canada, New Zealand, and Japan are discussed in detail in this chapter. The primary reason to choose these three countries is that, as a global representative of TSA, Canada is the pioneer and most comprehensive. New Zealand is one country that constantly prepares TSA each year, and Japan is the only country that is not early but continues every year in Asia. The second argument is to analyze the geographical position of the three countries, which are located on three distinct continents.

**1. Canada**

According to Meis (1999), Canada was the first country to release a national TSA in 1994. By 2010, national TSAs had been compiled by more than 60 countries. Most of them are based on the TSA: RFM, with necessary additions based on national realities. The first academic study of a TSA was by Nordstrom (1996), who focused on Sweden's TSA and found that tourist expenditure accounted for 4.5% of that country's gross domestic product (GDP) from 1992 to1993. Canada is one of the earliest and most complete countries globally to compile TSA, and its development and application of TSA are at the forefront of the world.

Its national TSA compilation began in 1988 and is now generally complied once every two years.

In Canada, the world's first TSA was released in July 1994 by Statistics Canada, which used data from 1988. And it showed for the first time the internal structure of tourism as an industry and the tourism products and services that constitute tourism economic activity; it revealed for the first time which industries are supported by tourism and which are less dependent on tourists (Kang, 2006b). To be precise, the total value of tourism consumption in 1988 was $30.3 billion, or approximately 4% of GDP; tourism generated $3.7 billion in goods taxes for all levels of government; tourism was ranked 12th among all industries in terms of economic contribution, and only 75% of total tourism GDP was generated by Canadian tourism sector businesses. It implies that tourist development must involve collaboration with firms in other sectors of the economy. The TSA's findings prompted the federal government to recognize tourism as a crucial sector for economic development and more than double governmental financing for tourism development. Additionally, it resulted in the reorganization of Tourism Canada as the Canadian Tourism Commission (CTC) (Jie Li, 2007). Thus, it has made important contributions to the development of tourism in Canada.

Characteristics of Canadian tourism satellite account

(1) Canada compiles TSA at the national level and has RTSA. And the Canadian TSA achieves consistency between the RTSA and the national level TSA regarding data, industry, and product classification (Kang, 2006a).

(2) The basic concepts used are consistent with the TSA: RFM and provide considerable flexibility.

(3) The development of TSA in Canada mainly utilizes national economic accounting information and statistical survey information such as tourism statistical survey and airline survey. Thus, it achieves the systematization of data sources and statistical survey and accounting information for TSA preparation, rather than relying on preliminary survey information. Moreover, this accounting information and statistical information can meet the needs of both national and regional levels in terms of data accuracy and reliability. And, in summing up its experience, Canada has emphasized the importance of adjusting tourism supply and demand data.

(4) The tourism products and industries in the Canadian TSA are more limited, and the tabulation method is simpler. It does not pursue the complexity and variety of tourism products and tourism industries but more accuracy and precision. Industries are divided into tourism industries and non-tourism industries and no longer distinguish between tourism characteristic industries and tourism-related industries, and industries are more concisely divided.

(5) Tourism consumption includes pre-travel consumption, but not post-travel consumption, nor does it contain personal non-market tourism services or tourism physical social transfers, physical tourism consumption, etc. Tourism products also do not include second homes, travel insurance, etc. Subject to data and other restrictions, it does not pursue the comprehensiveness of accounting content.

Besides，Canadian TSA also has deficiencies.

(1) Industry Classification of Canadian Tourism Satellite Account adopts the 1980 International Standard Industrial Classification (ISIC), which is different from the TSA: RFM.

(2) The Canadian TSA is relatively simple with only two core tables: the tourism consumption table by commodity and the GDP and employment tables for tourism and non-tourism industries. The Tourism Consumption by Commodity table captures inbound, domestic, and outbound tourism consumption in Canada. Its main columns are tourism goods and services. The side columns are domestic demand, inbound tourism demand, total demand, total supply, the product share of tourism supply, and outbound tourism consumption. Moreover, the GDP and Employment in Tourism and Non-Tourism Industries table provides a breakdown of value-added and employment by each tourism industry. The main columns are for each tourism industry, non-tourism Industry, etc. The side columns are for value-added by basic price, each component of value-added, the number of jobs, average compensation per employed person, and labor productivity per employed person.

### 2 . New Zealand

New Zealand Tourism Satellite accounts are characterized by being compiled on a continuous annual basis, resulting in yearly time series data for tourism indicators. In this way, the annual TSA is less expensive to produce, and some of the value-added and output composition ratios can be reused.

The basic information of the New Zealand TSA including:

(1) Along with adhering to the UNWTO's fundamental principles, New Zealand has modified its circumstances. For instance, the usual environment is defined as a one-way excursion greater than 40 kilometers from home. International travelers, on the other hand, are not subject to this. For tourism demand, tourism expenditure minus GST is used, which covers purchases made by tourists during, before, and after their trip.

(2) Products are explicitly classified as tourism characteristic products, tourism-related products, and non-tourism-related products. Tourism characteristic products, referring to the absence of tourists, whose sales would be significantly reduced or lost in meaningful quantities. And for the tourism characteristic products and tourism-related products to do a quantitative definition, the tourism characteristic products should be purchased by tourists 25% of the total sales, i.e., the tourism ratio of the product should be at least 25%. The proportion for tourism-related products should be less than 25%. The industry classification is also clearly divided into tourism characteristic industries, tourism-related industries, and non-tourism-related industries. The New Zealand Standard Industrial Classification System (NZSIC) is used as the classification standard. A tourism characteristic industry is one in which

industry is 25% or more of the industry's output purchased by tourists, while the proportion of tourism-related sectors is less than 25%.

(3) The New Zealand TSA has been compiled mainly following the TSA: RFM and consists of eight main tables.

Table 1 shows tourism consumption by visitor type and product type, with visitor type referring to domestic tourism demand and inbound tourism consumption; however, no distinction is made between one-day and multi-day visitor profiles.

Table 2 shows the production accounts for tourism characteristic industries, related industries, and all other industries.

Table 3 shows the sales accounts by-product and tourism industry, including sales in tourism characteristic industries, tourism-related industries, non-tourism industries, etc.

Table 4 shows the proportion of tourism for products.

Table 5 shows the proportion of tourism by industry.

Table 6 shows the calculation of tourism value-added.

Table7 shows the table of tourism employment and compensation of tourism employees.

Table 8 shows the fixed capital formation and net capital stock according to Industry.

(4) Data for the supply side of tourism are obtained from the annual input-output tables for New Zealand. For the tourism demand or tourism consumption component, data are obtained from the following sources: first, the International Visitor Survey, and related items on the Balance of Payments, the latter also requiring appropriate adjustments to accommodate the compilation of tourism satellite accounts, such as subtracting the costs of international students and those traveling primarily for medical purposes. Second, data on resident, business, and official tourism consumption are obtained from domestic travel surveys and, in part, from household economic surveys, etc. The third is about residents' spend on outbound tourism. Part of the expenditure occurs in their home country, such as the purchase of air tickets of domestic airlines before leaving the country, the cost of participating in the travel agency group of their home country, quarantine, travel insurance, etc. These data come from the annual statements of relevant enterprises, the balance of international payments, and the household economic survey. Fourth, travel durable goods purchased outside of travel, from household economic surveys. Fifth is the virtual calculation of rent for vacation homes from relevant census data and real estate survey data. Due to data limitations, the New Zealand Tourism Satellite Account does not account for individual non-market tourism services, such as visitor information centers, museums, national parks, libraries, concert halls, etc.,

Characteristics of the New Zealand TSA

(1) It accounts for direct and indirect tourism value-added tourism employment.

(2) It distinguishes between tourism-specific industries and tourism-related industries.

(3) It is also more flexible in its tables and does not adhere to the UNWTO's recommendations. The table does not distinguish between one-day and overnight visitors' expenditure because it is difficult to distinguish between the total number of days and overnight visitors. In addition, a table of fixed capital formation in the tourism industry has been developed.

### 3. Japan

The Japan Tourism Agency(JTA) compiles the TSA every year. There are two types of tourism expenditure surveys conducted by the JTA. The first is a study of domestic tourism spending, which is based on 46 different consumption items. Other is a survey of inbound tourism expenditure based on the consumption of 20 different foods. These expenditure surveys are summarized as TSA Tables 1 to 3. Table 4 is based on Tables 1 through 3. Recompiling the SNA Supply and Use Tables yields Table 5. Furthermore, Table 6's total output is calculated by dividing Table 5 by Tables 1 to 4. Each item of gross value added is determined in Table 6 by multiplying the input coefficients or value-added coefficients with Industry's total output. The SNA Use Table is used to obtain the input coefficients, also known as value-added coefficients. As a result, the GDP of tourism is calculated. Table 7 depicts the entire procedure in full.

While the Economic and Social Research Institute of the Cabinet Office (ESRI) compiles the SNA, the JTA compiles the TSA. To create the TSA, the JTA receives complete Supply and Use Tables from the Economic and Social Research Institute.

The TSA is compiled annually by the Japan Tourism Agency (JTA). The JTA conducts two types of tourism expenditure surveys. One is a survey of domestic tourism expenditure. It is performed based on 46 consumption items. The other is a survey of inbound tourism

expenditure. It is based on 20 consumption items. TSA Tables 1 to 3 is compiled by aggregating these expenditure surveys. Table 4 is compiled based on Tables 1 to 3. Table 5 is made by recompiling the SNA Supply and Use Tables. Moreover, the total output in Table 6 is estimated by dividing Table 5 by Tables 1 to 4. By multiplying the input coefficients or value-added coefficients with Industry's total output, each item of gross value added is calculated in Table 6. The input coefficients or value-added coefficients are obtained from the SNA Use Table. As a result, the tourism GDP is estimated. The detailed process is shown in Table 7.

In Japan, while the SNA is made by the Economic and Social Research Institute in the Cabinet Office (ESRI), the TSA is compiled by the JTA. Therefore, the JTA receives the detailed Supply and Use Tables from the Economic and Social Research Institute to compile the TSA.

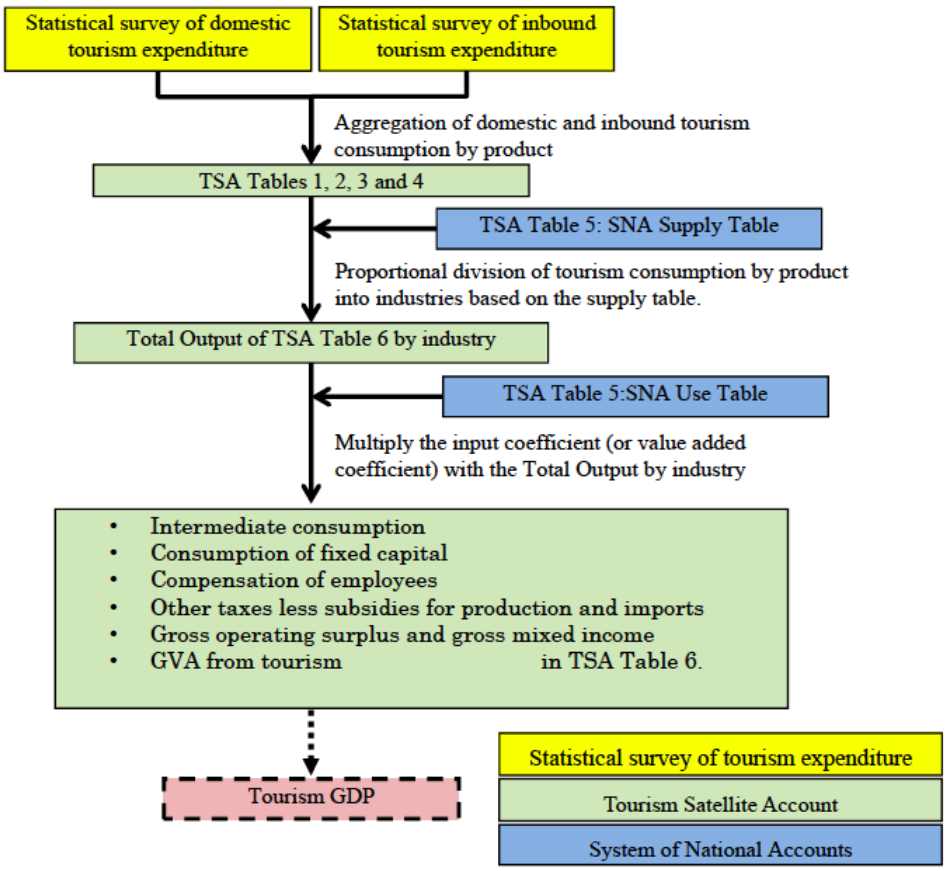


Figure 5. Overview of TSA Compilation in Japan

Source: Kozo, Fumikado, Etsunobu, and Taku (2015)

# Chapter 3 The development of the Regional Tourism Satellite Account (RTSA)

## 3.1 The development of the World's Regional Tourism Satellite Account

In the context of this article, "region" corresponds to the level of regional disintegration of a country in terms of political and regulatory organization and is a unit of authority. There are different levels of regional division between countries: territories, states, regions, sub-national regions, etc.(INRouTe, 2016). The preparation of the RTSA consists of adjusting the concept of TSA and refining it to a specific local level. When compiling an RTSA, tourism revenue from foreign tourists and non-local domestic tourists should be considered an injection into the regional economy. As a result, RTSA methods are more complex, and raw data collection costs are higher (Jones, Munday, & Roberts, 2003). In addition, detailed preliminary studies on this subject by the World Tourism Organization (2010) and Eurostat (2009) are limited to one question, namely the existence of RTSAs as regional extensions of national TSAs, without investigating other issues related to regional TSAs (Frenţ & Frechtling, 2020). To promote the development of the RTSA, Frechtling (2009) proposed the general principles to be followed in the development of RTSA, and these principles were introduced at the UNWTO International Conference on Measuring Tourism Economic Contribution at Sub-national Levels in Malaga (Spain).

1. Measure the impact of tourism and only tourism.

2. Use mainly national income account information rather than estimates derived from models.

3. Including at least ten characteristic tourism products and industries.

3. Include at least ten tourism specialty products and industries identified as the core of TSA (TSA: RMF 2008).

4. Generate some estimates of macro-economic aggregates -- for purposes below the national level. These figures are simplified into domestic tourism expenditure, domestic tourism consumption, Gross regional product, and employment in tourism industries.

5. Generate an established set of tables and their relationships - for purposes below the country, these tables have been reduced from 10 to 5.

1. Table 4: Internal Tourism Consumption by Product

2. Table 5: Production Accounts of Tourism Industries and Other Industries

3. Table 6: Total Domestic Supply and Internal Tourism Consumption

4. Table 7: Employment in the Tourism Industries

5. Table 10: Non-monetary Indicators

Furthermore, there are two different conceptual and methodological approaches for establishing regional or subnational TSA about the compilation method. They are the "interregional approach" and "regional approach." *The former is "to apportion territorially certain parts or variables of an available national TSA, using different indicators and methods" (UNWTO, 2013).* This kind of method has been attempted in Canada. It is also known as the "top-down" approach. The "regional approach," which is also regarded as the "bottom-up" approach, is similar to establishing the national-level TSA (Jones & Munday, 2010). This kind of approach treats the region as a "small nation." It considers the general condition and the interregional elements(Jones, Munday, & Roberts, 2009).

Jones et al. (2009) argue that the top-down approach has the advantage of low cost, especially if national surveys produce high-quality region-specific data. The authors

emphasize that one of the basic conditions for this approach is regionally stratified household surveys, business censuses, and tourist surveys. As for the bottom-up approach, the basic requirement is data at the specific regional level. Without this data, this method cannot be applied. Regarding this method, the World Tourism Organization (2005) warns that it is an expensive method. This method is expensive due to the large amount of data required. Therefore, it is only suitable for areas where the tourism industry is well represented in regional statistical systems and has muscular regional regulatory bodies. Jones et al. compare the top-down and bottom-up methods, the detailed information shown in table 6.

**Table 6. The comparison between TSA-R and R-TSA**

| | Needs | Benefits | Problems |
|---|---|---|---|
| TSA-R (top down) | • Proactive central statistical office<br>• Regionally stratified national surveys | • Relatively fast<br>• Regional results comparable<br>• Benefits from central expertise<br>• Credibility in central government, etc. | • Limited number of variables<br>• Regional uniqueness ignored<br>• Inflexible to policy needs<br>• Lower potential for modelled analyses |
| R-TSA (bottom up) | • Developed regional account<br>• Regional tourism consumption data<br>• Local institutional engagement<br>• Technical human capital | • Flexible to policy need<br>• Complete suite of results<br>• Detailed understanding of regional tourism economy<br>• Base for additional analyses and economic modelling | • Long-term option<br>• Costly<br>• Non-standardised across regions<br>• Risks fragmentation of national TSA development |

Source: Jones, C., Munday, M., & Roberts, A. (2009). Top-down or bottom-up? Issues in the development of sub-national tourism satellite accounts. *Current Issues in Tourism, 12*(4), 301-313.

However, since then, there have been no more follow-up studies.

According to The IRTS 2008 and TSA: RFM 2008, the benefits of RTSA including：

1) Assisting state/provincial and other regional tourism authorities in understanding the contribution of tourists to the economy, as the national TSA has done;

2) Describing the specific characteristics of this contribution as it relates to this area, which can be compared to other sub-national regions and countries;

3) Assist national and regional authorities in developing helpful policies to attract tourists and investments ;

4) Allowing local and national authorities to track changes in the economic contribution of tourists over time;

5) Showing the size and extent of tourism industry networks and the potential productive partnerships;

6) Enabling comparisons of the economic contribution of tourism across regions and between regions and countries.

7) The following main aggregates are measured: domestic tourism expenditures, domestic tourism consumption, tourism gross regional product, and tourism employment.

8) Other statistical items not approved by the TSA may be attached to the RTSA as additional information memoranda.

For China, the significance of compiling RTSA is mainly reflected in the three aspects. Firstly, many provinces and municipalities have made tourism an important local industry or pillar industry, especially in areas with rich tourism resources such as Yunnan and Hainan, where the tourism industry has driven the development of the local economy. In this case, the economic accounting of tourism is more demanding. As part of the national economic accounting, one of the primary purposes and functions of the TSA is to account for the value added of the tourism industry. Therefore, RTSA can objectively measure the contribution of tourism to regional GDP and provide a basis for the government to formulate industrial policies on tourism.

Secondly, a large amount of data is required to compile TSA, and TSA provides a more detailed and specific classification of tourism products and the tourism industry in a more detailed and specific way. In this way, the compilation of RTSA also helps to improve the essential work and technical level of tourism statistics in China and helps to improve the scientific and standardized tourism statistics.

Thirdly, as a logical and rigorous accounting and conceptual system, the unified concept, product, and industry classification system of RTSA can provide basic data and methodology for in-depth tourism economic research. RTSA is also helpful in obtaining aggregate indicators such as tourism value-added, analyzing the contribution of tourism activities to the economy, and obtaining indicators for further detailed decomposition. The RTSA also has the potential to develop and extend a framework that can provide a basis for in-depth tourism policy analysis, tourism economic modeling, and measurement of tourism productivity.

The reason is mainly that China's current tourism statistics are not perfect, and there are problems such as poor quality of tourism statistics and backward survey methods. On the other hand, the establishment of TSA needs to start from the reform of the tourism statistics system, but the administrative division of China and the economic environment is complex, so it is not a simple thing to change quickly, which requires a lot of financial resources, human resources and time. It is more feasible to start from regional TSA because the workload of RTSA is relatively tiny, and regions above the provincial level have their input-output tables and statistical survey methods. Second, for some regions with more developed tourism industries, they have a strong need to establish TSA to account for the importance of tourism in the national economy to provide a solid basis for decision making.

To have a good understanding of the development of RTSA around the world. Refers the

secondary research including published academic papers, conference presentations, UNWTO publications, government documentation to make a serious comparison about existed RTSA. Finally, 14 countries were identified as having RTSA development: Canada, China, Denmark, Finland, India, Italy. Norway, Poland, Portugal, Spain, and UK (Frenț & Frechtling, 2020). Except for China, this paper has thorough the basic situation. Table 7 shows the detailed information about RTSAs identified in the 14 countries presented from the breakdown by-products and tourism industries, number of tables, the existence of regional I-O Table, and the reference period with published data.

**Table 7. Methodological characteristic in the compilation of RTSAs**

| *Country* | *Name of region/Territorial dis-aggregation (NUTS level in Europe)* | *Breakdown by products (for tourism consumption)* | *Breakdown by tourism industries Number* | *Detailed tables of results* | *Existence of a regional Input-Output table* | *Reference period with published data* |
|---|---|---|---|---|---|---|
| Belgium | Flanders (NUTS 1) | 8 | 12 | 3 | Yes | 2008–2016 (every 2 years) |
| Norway | 19 counties (NUTS 3) | 3 | 3 | 8 | Yes | 1997, 2007 |
| Finland | 21 counties (NUTS 3) | 24 | 13 | 4 | Yes | 2000–2007, 2013–2015 |
| Austria | Vienna (NUTS 2) | 8 | ... | 4 | No | 2002–2008, 2011, 2013, 2015 |
| | Upper Austria (NUTS 2) | 8 | ... | 6 | No | 2003–2016 |
| | Lower Austria (NUTS 2) | 8 | ... | 2 | No | 2005–2009, 2011 |
| Spain | Andalusia (NUTS 1) | 15 | 11 | 5 | Yes | 2000, 2005, 2010 |
| | Community of Madrid (NUTS 1) | 12 | 8 | 8 | Yes | 2006–2010 |
| | Basque Country (NUTS 1) | ... | 11 | 2 | Yes | 2010–2015 |
| Australia | 8 states and each component region | 18 | 17 | 15 | Yes | 2006/7 – 2016/7 |
| Denmark | 5 regions (NUTS 2) | 21 | 8 | 7 | Yes | 2006, 2016 |
| Canada | 13 provinces | 24 | 13 | 2 | Yes | 1996–2014 |
| UK | Wales (NUTS 1) | 18 | 16 | 7 | Yes | 2000, 2003, 2007, 2011 |
| | Scotland (NUTS 1) | 18 | 12 | 6 | Yes | 2000 |
| Poland | Mazovia (NUTS 2) | 15 | 6 | ... | No | 2012 |
| Italy | South Tyrol (NUTS 2) | 10 | 6 | 6 | ... | 2005, 2008 |
| | Tuscany (NUTS 2) | 12 | 11 | ... | ... | 2012 and 2013 |
| Portugal | Madeira (NUTS 1) | 10 | 10 | 7 | No | 2001, 2015 |
| | Azores (NUTS 1) | 10 | 10 | 6 | No | 2001, 2015 |
| India | 33 states | 20 | 11 | 6 | No | 2009–2010 |
| China | Guangdong (province) | ... | ... | ... | ... | 2014 |
| | Jiangsu (province) | 13 | 12 | 5 | ... | 2002 |

Source: Frenț, C., & Frechtling, D. C. (2020). Regional tourism satellite accounts: towards international comparability. *Tourism Review*.

Furthermore, Table 8 introduced the information about the four macroeconomic aggregates proposed by the suggestion of Frechtling.

**Table 8. TSA aggregates found in RTSAs**

| *RTSA for* | *Internal Tourism Expenditure (ITE)* | *Internal Tourism Consumption (ITC)* | *Tourism Gross Regional Product (TGRP)* | *Tourism Gross Value Added (TDGVA)* | *Employment in Tourism Industries (ETI)* | *Direct Tourism Employment (DTE)* |
|---|---|---|---|---|---|---|
| Flanders and Brussels (BE) | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Norway | ✓ | ✓ | ✓ | | ✓ | |
| Finland | ✓ | ✓ | | ✓ | ✓ | |
| Vienna (AT) | ✓ | ✓ | | ✓ | | |
| Upper Austria (AT) | ✓ | ✓ | | ✓ | | |
| Lower Austria (AT) | ✓ | ✓ | | ✓ | | |
| Andalusia (ES) | | ✓ | ✓ | ✓ | ✓ | |
| Community of Madrid (ES) | | ✓ | ✓ | | | ✓ |
| Basque Country (ES) | | ✓ | ✓ | | | ✓ |
| Australia | | ✓ | ✓ | ✓ | | ✓ |
| Denmark | ✓ | ✓ | ✓ | | | ✓ |
| Canada | | ✓ | ✓ | | ✓ | ✓ |
| Wales (UK) | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Scotland (UK) | ✓ | ✓ | | ✓ | ✓ | ✓ |
| Mazovia (PL) | | ✓ | ✓ | ✓ | ✓ | |
| South Tyrol (IT) | ✓ | ✓ | | ✓ | | ✓ |
| Tuscany (IT) | | ✓ | ✓ | | | ✓ |
| Madeira (PT) | ✓ | ✓ | | ✓ | ✓ | |
| Azores (PT) | ✓ | ✓ | | ✓ | ✓ | |
| India | | ✓ | | ✓ | ✓ | ✓ |
| Jiangsu (CN) | | ✓ | | ✓ | ✓ | |
| Guangdong (CN) | | ✓ | | ✓ | | |

This part will give the introduction to Denmark and Australia's RTSA. Compared with other RTSAs, the RTSA in these two countries is relatively mature. The research is relevant to Denmark relatively new. And Australia has the complete RTSA among the world, even for the small region, such as blue mountain is one of the attraction spots of New South Wales.

## Denmark

J. Zhang (2005a) states that the Denmark National Tourism Organization (visit Denmark) and the Institute of Local Government Studies (AFK) have started collecting the tourism demand data in Denmark and analyzing the tourism economic impact together since 1996. At the same time, The RTSA in Denmark is a cooperative project between the Centre for Regional and Tourism Research (CRT) and Visit Denmark (VDK). The reason for initiating a regional TSA rather than a national TSA is that Danish tourism activity and tourism data have been regionalized based on tourism interview data at the regional level.

Furthermore, it is far more important to analyze the economic consequences of regional tourism in Denmark than to analyze the national tourism impacts (J. Zhang, Madsen, & Jensen-Butler, 2007). Therefore, the regional TSA will be a new tool for analyzing the regional impact of tourism in Denmark. The compilation of RTSA in Denmark is combined both "bottom-up" and "top-down" approaches.

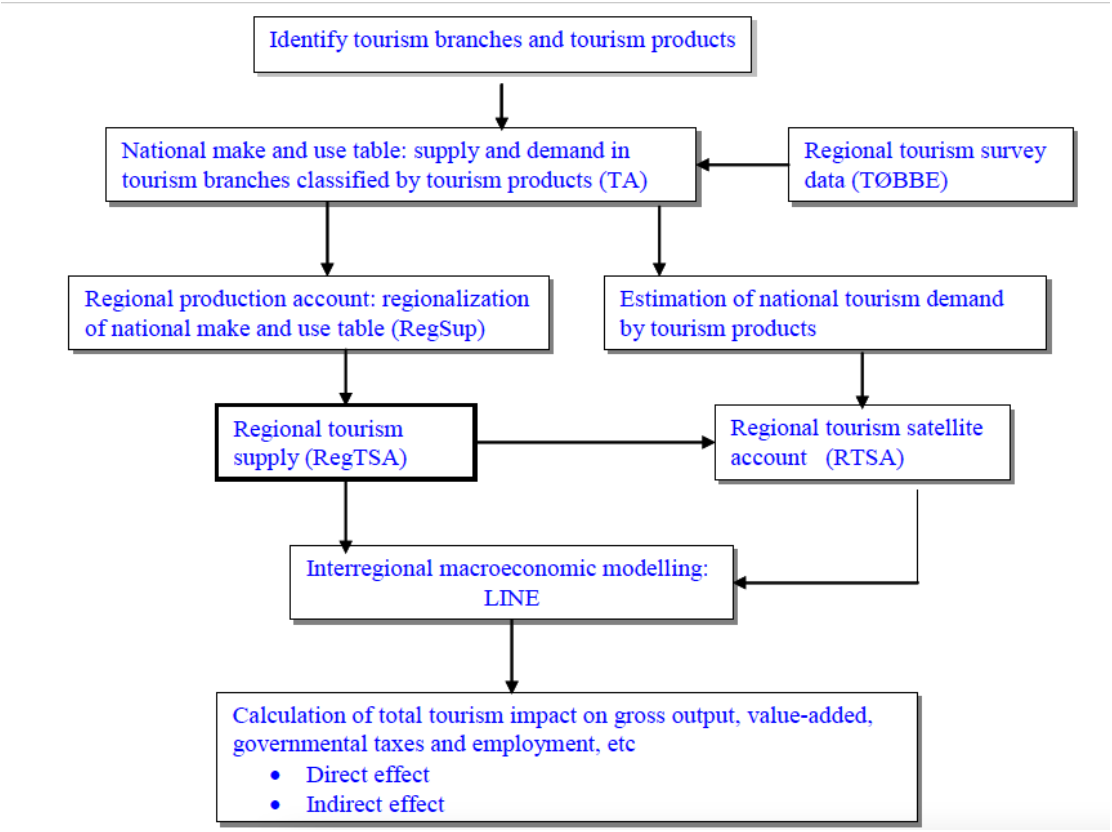


Figure 6. introduces the methodological procedure of making RTSA.

Source: Zhang, J. (2005). *Regional tourism satellite accounts for Denmark: accounting and modeling*. Paper presented at the 15th International Input-Output Conference.

Tourism survey data, called TØBBE data, is an important basis for constructing RTSA, which is generally used to translate tourism consumption into product categories and estimate tourism demand (Xue, 2012). First, the Danish tourism survey data includes

overnight and one-day tour consumption data, which make up the regional-level tourism consumption. The overnight tourism data is based on official tourism statistics on overnight beds from Denmark Statistics, supplemented by data from an interview survey conducted by the Danish National Tourism Organization for some specific forms of overnight tourism. Second, the data on one-day tour consumption is calculated from a large number of tourist interviews. The Danish National Tourism Organization has been implementing a tourist survey regularly since 1996. This survey covers 16 different forms of accommodation business forms and is conducted in all regions of Denmark. Moreover, the surveyed tourists include foreign and domestic tourists, and the survey covers tourist overnight locations, accommodation business forms, domestic and foreign tourist sources, and one-day tour consumption(J. Zhang, 2005a).

In addition to tourism statistics and survey data, many regional statistics organized on a municipality basis are applied to the Danish R-TSA data system, including employment numbers, primary and other income, etc. (J. Zhang, 2005b). The key to the application is the redefinition of tourism activities within the traditional standard sectors and allocating sectoral attribution of data. For example, hotels are listed as one sector in the traditional standard sector. However, in the detailed sector, hotels are divided into seven subsectors in Denmark: hotels with restaurants, conference centers, hotels without restaurants, youth hostels, campgrounds, vacation centers, and other facilities for short stays. These detailed industry data (basic income or employment) can calculate the demand share of the tourism industry(Xue, 2012).

During this process, It is worth noting that although information on the supply of each tourism product is available, tourism demand is still not known from the national accounts. This is because consumption of tourism products is either buried in intermediate

consumption or private (or public) consumption in the national use tables. It means the national use tables do not tell us, for example, how much of a restaurant product is consumed by tourists and how much of the product is used by residents. Therefore, tourism survey data is introduced into the system. The purpose of applying tourism survey data is to distinguish between tourism consumption and consumption by residents.

The advantage of Danish RTSA including：

A) It is based on official documents and recommendations.

B) It merges the accounting portion of the TSA with the modeling portion, both based on national accounts. As a result, the Danish TSA is consistent with the Danish National Account.

C) It has a time series and can predict the TSA tables to the present year.

D) It is a regionalized TSA to be more easily applied to the analysis of the tourism-oriented regional economy.

There is also shortcomings of Danish RTSA that need to improve:

1) Outbound tourism data needs to be improved. Danish outbound tourism has not been compiled into the TSA system, and there is a need to strengthen outbound tourism statistics and surveys.

2) Domestic business tourism data needs to be improved. The conference industry and business tourism play an important role in the tourism economy, and there is a need to strengthen tourism statistics and surveys for business visitors.

3) Consistency with national accounts must be further enhanced to ensure consistency with regional supply and demand data. Some information such as car rental tourism consumption is still not available in the tourism survey, so there is still a need to adjust the tourism survey.

### Australia

Australia has abundant tourism resources, especially natural resources, which attract millions of tourists from the world. According to *The Travel & Tourism Competitiveness Report 2019*, Australia has powerful competitively related to tourism globally, which is the seventh (World Economic Forum, 2019). The tourism GDP for 2017-2018 is about 57.3 billion Australian dollars, which increased by 5.0 %, compared with the national GDP growth of 3.1%. Moreover, tourism employment is 646,000 persons, which occupied a 5.2% Australian workforce (Tourism Research Australia 2019). Australia consists of six states and two territories.[20] Moreover, tourism is an essential pillar of Australia's economy. It especially has tremendous significance in Queensland and Tasmania. Pham, Dwyer, and Spurr (2008) describe the first Australian national tourism satellite account was published in October 2000, based on the data of the year 1997-1998, by the federal government's central statistical office and the Australia Bureau of Statistics (ABS). After that, it updated each year and did a comprehensive review every three years. In 2013, Australia's federal green paper indicated that RTSA would provide "valuable input to industry and government in terms of tourism's impacts and help inform investment and policy decisions by industry and government respectively" (Van Ho et al., 2009). Hence, in Australia, each state, territory, and even the small region is encouraged to establish TSA. The State and Territory Tourism Satellite Accounts (STSA) in Australia are produced by the Sustainable Tourism Cooperative Research Center (STCRC) with the help of each state and territory's tourism administration(H.-B. Zhu & Noel, 2016).

[20] New South Wales (NSW), Victoria (VIC), Queensland (QDL), Western Australia (WA), South Australia (SA), Tasmania (TAS), Northern Territory (NT) and Australian Capital Territory (ACT).

Furthermore, STCRC also continually estimates tourism economic contribution to the sub-state level using the same methods and definitions as the national TSA. According to Tourism Research Australia (TRA), the STSA includes data about consumption, employment, and economic activity. Therefore, it could estimate the tourism economic effect from both the direct and indirect side (TRA, 2019). Australia's STSA keeps consistent with the national TSA in the area, such as basic conception, definition, classification, compilation, and tourism data resource. In the hybrid approach (part bottom-up, part top-down) adopted for this project, each state and territory is effectively viewed as a small tourism region. Specific state and territory input-output tables are derived from the MMRF-G CGE model developed from the Centre for Policy Research at Monash University were used (Philip D. Adams, 2003). However, to maximize the consistency of the eight STSAs, it is important to be consistent with the national TSA to adopted a consistent data set. Interstate trade is treated as an independent country that trades with other countries (states), thus allowing regional issues to be addressed within the TSA structure and classification scheme. The tourism expenditure data comes from a relatively new travel data set produced by the TRA and the federal government tourism statistical body. Based on this dataset, top-down and bottom-up information is used to allocate visitor spending from the two main national tourism surveys (the International Visitor Survey and the National Visitor Survey) to each of the states ((Pham et al., 2008)). The methodology of constructing STSA is shown in Figure 7. After eight preliminary TSA's were completed, the results were checked against the national TSA. To ensure that state results match national totals and that individual data issues are resolved in a way that does not affect overall national and state TSA consistency.

Using a single STCRC modeling team to build a TSA has several benefits:

1) It helps ensure consistent approaches and assumptions are used to make TSA and impact models comparable and credible.

2) Linking the development of TSA with the development of CGE models, bringing into play the synergies of concept and data development, which is unique in the world.

3) Enables cost savings from economies of scale to be shared among participants.

However, Australia RTSA also has the limitations, such as data limitations, because some tourism consumption data is not especially collected for state and territory.

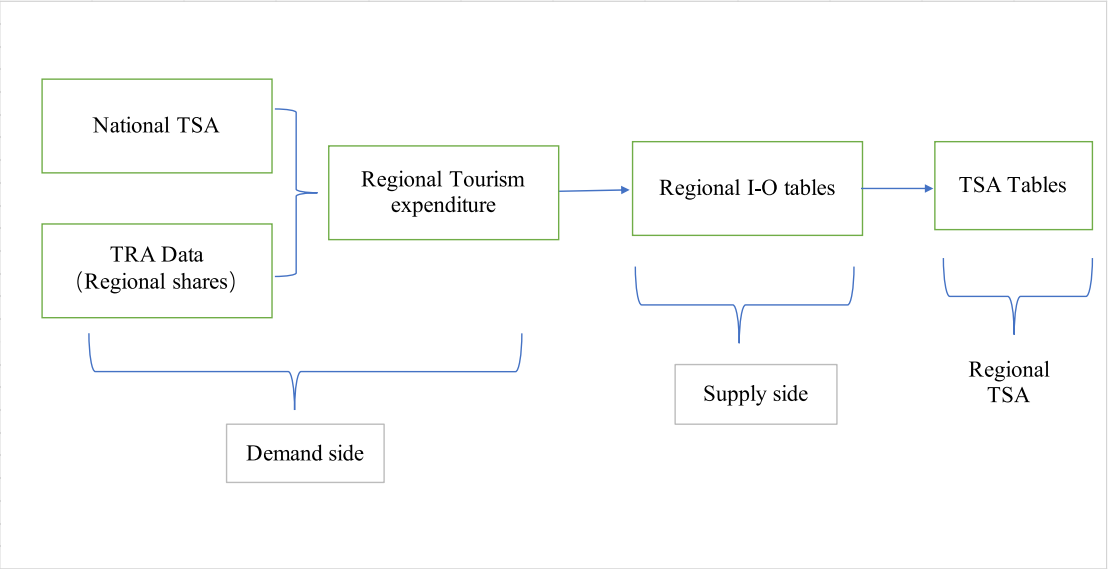


Figure 7. The process of establishing

Since there is no universally recognized RTSA globally, countries and regions are only flexible in the compilation of RTSA under the TSA: RFM 2000 and 2008 of fundamental principles and according to the actual situation of the region. Comparing with other countries, researchers in China begin to study TSA in 1999. One significant difference with other countries is establishing TSA in China from the regional/ sub-national level. A limited number of provinces and cities such as Jiangsu province, Zhejiang, and Xiamen was based on the TSA: RFM 2000 for the preparation of attempts, but they did not define the connection and differences between R-TSA and TSA, nor summarize the model of R-TSA in

China, and it is not easy to further promote it. The following part will introduce the development of China's R-TSA by the timeline.

Xiamen, a city of Fujian province, is the first region to compile RTSA in 1998 among mainland China (M.-Y. Li, 2008). Xiamen TSA-1998 completed six tables and calculated tourism economic contribution to Xiamen's GDP is 4.94% finally (L.-X. Zhao & Wei, 2001). The significance of this attempt is that the supply-demand balance that exists in the economy of a nation, not exist in regions. Compared with the whole national economic system, openness is one of the most important regional economic characteristics. The basic principle of establishing a national TSA is balancing supply and demand in a country's economy. From the perspective of demand, tourism consumption is regarded as a net output. However, tourism expenditure from outside the region is not generated by the economic activities in the region.

TSA - 1997 in Guangxi, one characteristic is making a more specific classification of tourism characteristic products (M.-Y. Li, 2008). And then, based on the input-output Table, it analyses the regional tourism product inflows and outflows and calculating the indirect effects on the regional tourism contribution rate, tourism activities in direct and indirect contribution rate of the GDP of Guangxi were 6.7% and 8.9%, respectively (Tourism Bureau of Guangxi Zhuang Autonomous Region, 2004).

The province of Jiangsu began compiling RTSA in 2001, following international standards to create China's first provincial TSA (JS-TSA, 2006). In September 2002, the working group completed the Jiangsu tourism satellite account framework. After a series of preparations, in September 2004, the Jiangsu Province tourism satellite account 2002 (JS-TSA2002) review passed. As the first provincial regional tourism satellite account in China, the research and construction of JSTSA-2002 have far-reaching significance. Without an

international RTSA guide, JSTSA-2002, which has been compiled by a research group composed of many experts for three years, has made many breakthroughs in the following aspects:

1. The conceptual system of TSA has been improved, and TVA and VATI have been distinguished;

2. Following TSA: RMF 2000, the social transfer of tourism in kind is included in Table 4 (Jiangsu regional tourism consumption);

3. According to the requirements of SNA93 for satellite accounts, it determines the classification of Jiangsu tourism characteristic products and tourism characteristic industries, rather than the idea from industry to output in general industrial economics. It solves data re-merging, splitting, and sorting when the local TSA industry classification is inconsistent with the input-output Table's industry classification.

4. In the process of data processing and summarizing in Table 6 (Regional Total Supply and Regional Tourism Consumption), the ratio of tourism products is calculated first. Then, the ratio of the tourism industry is calculated to measure TVA accurately. At the same time, TSA is organically linked with regional national economic accounts.

JSTSA-2002 provides a Chinese sample for the world and a successful demonstration of TSA for China.

In 2005, Zhejiang Province began to compile the RTSA. Zhejiang Tourism Satellite Account (ZJ-TSA 2004) followed the TSA: RFM 2000 in the compilation method. In 2006, ZJ-TSA was released. It also introduced some characteristics and innovations:

1. It refers to many economic census data combined with a large number of special investigations. It also effectively integrated the latest national economic accounting. Therefore, data sources have a more accurate and reliable basis. As a result, ZJ-TSA

2004 becomes the true sense of the national economy subsidiary account, and its results are more believable.

2. Second, it adopted the unified compilation and hierarchical accounting method of the whole province and 11 cities; the tourism accounting of each city in the province has been brought into the overall framework of the province, which has solved the problem of incomparability tourism statistical data of the province.

To fill the gaps in some of the current tourism statistics, improve and supplement the existing tourism statistics system. Moreover, implement the survey for the household reception of inbound tourists, business visitors, and so forth, which raised.

3. The integrity and reliability of domestic tourism income, number of domestic tourists, the number of inbound tourists, international tourism income.
4. It tries to calculate the value of tourism consumption of self-use or free use of the second residence.
5. Try to calculate the regional tourism business costs so that the tourism consumption statistics more comprehensive.
6. To explore the measurement method of tourism public consumption. Under the background that the government mainly drives China's tourism industry development, the study of tourism public consumption has great practical significance.

In 2008, Beijing's 2004 tourism satellite was released, which used Beijing's economic census data and tourism survey data in 2004 to solve the lack of essential data such as tourism added value and tourism employment in Beijing.

In 2012, the Shandong Tourism satellite account 2008 (SD-TSA 2008) had been published. Comparing with the other Chinese Regional Tourism Satellite Account (CRTSA),

SDTSA has three innovations (Shandong Tourism Satellite Account Compiling Group, 2012). Firstly, it had a more precise and stricter definition than other CRTSAs. For instance, in JS-TSA 2002, "the duration of a trip" roughly clarifies "Within 12 months". However, in SD-TSA 2008, "the duration of a trip" means the time is up to 6 hours, but less than 12 months. Secondly, it has completed ten tables, and this is the most completed CRTSA in China until now. The third innovation is to use the "outside province tourist" and "local tourist" instead of domestic tourists. Because SD-TSA2008 focused on the region, the index of "domestic tourist" is usual but fuzzy. This kind of adjustment could be more suitable in terms of regional tourism satellites.

In 2013, Guangdong Tourism Satellite Account Research Group compiled the Guangdong Tourism Satellite Account according to the data of Guangdong Province in 2010. First of all, Guangdong TSA 2010 no longer differentiates tourism characteristic industries and tourism-related industries, collectively referred to as the tourism industry.

Table 8 compares the supply data sources, characteristic industries, and Table of TSA in four regions with relatively mature compilation in Jiangsu, Zhejiang, Beijing, and Guangdong to analyze TSA development in China.

**Table 8. The methodology between Jiangsu, Zhejiang, Beijing, and Guangdong**

| | Similarity | Jiangsu TSA 2002 | Zhejiang TSA 2004 | Beijing TSA 2004 | Guangdong TSA 2010 |
|---|---|---|---|---|---|
| **Data source** | Mainly based on economic census data and input-output table | Economic census 2002 and Jiangsu I-O table 2002 | Economic census 2004 and Zhejiang I-O table 2004 | Economic census 2004 | Economic census 2008 and Guangdong I-O extention table 2010 |
| **Tourism characteristic producs** | Based on the TSA: RMF 2000 and 2008 | Based on the TSA: RMF 2000 | Based on JS- TSA in passenger transport services supplemented by transport auxiliary and support services, maintenance and repair services, transport agents, and adjusted the classification position of the conference industry. | Based on TSA:RFM2000, the list of tourism products is adjusted into 8 sections, 21 sub-projects and 56 specific products. | 1. TSA: RFM 2008 no longer distinguishes between tourism characteristic industries and related industries, collectively referred to as tourism industry.<br>2. According to the characteristics of tourism development in Guangdong Province, the three industries of conference and exhibition industry, hot spring resort industry and golf course service industry are accounted for separately.<br>3. The output of the film industry is included in the total output of entertainment industry<br>4. The total output of religious organizations is included in the total output of culture and art products |
| **Tourism industry** | Based on the TSA: RMF 2000 and 2008 | Based on the TSA: RMF 2000 | Inclusion of environmental resources industry as a tourism-related industry | Culture and art industry' adds mass cultural activities, culture and art economic agents, other culture and art and religious organizations | |
| **Table** | Table 1- Table 7 | Table1-Table7 and Table 10 | Table 1-Table 7 and Preliminary accounting for public consumption in tourism | Table 1-Table 7 | Table1-Table 8 and Table 10 |
| **Others** | None | Comparison with traditional tourism accounting: 1. Analysis on the total consumption and composition of residents before and after travel in Jiangsu Province 2. The social transfer of the tourism consumption in Jiangsu Province | Compared with JS-TSA and Beijing TSA: 1. Supplemented the accounting of Agricole, tourism business expenses, second homes, and car rentals 2. Separate accounting for cities in Zhejiang. 3. Reflected Zhejiang tourism characteristics, such as accounting for rural tourism consumption and Agricole restaurants, Yiwu small commodity market for the inbound business visitor. | None | Compared with JS-TSA, Beijing TSA and ZJ- TSA: 1. Accounting for residents' travel and hospitality expenses<br>2、Accounting for business travel hospitality expenses of enterprises |

Source: According to the reference, edited by the author

## 3.2 The comparison between QDTSA and SDTSA

A paper assessed how closely United States Travel and Tourism Satellite Account (USTTSA) conforms to the United Nations standards (FrenŢt & Frechtling, 2015). In addition, Unlike the national TSA has a unified standard, RTSA still in the process. Hence, most RTSA developed according to the TSA: RFM 2008. Moreover, there is no research to

assess the degree of RTSA conforms to the United Nations standards. Therefore, the following part will compare QDTSA in Australia and SDTSA2008 in China to determine the differences and similarities.

### 3.2.1 The outline of Shandong Tourism and Queensland

Shandong is located in the East China region, with 157,100 square kilometers. According to the yearbook of China tourism 2016, the domestic tourism consumption of Shandong has exceeded 7000 million Yuan, which occupied the 11.2% of GDP in 2015. Moreover, tourism investment is 1400 million Yuan in Shandong. Furthermore, the number of visitor arrivals, Shandong is the seventh among China's mainland[21], which are about 440.52 thousand people (Figure 8). Besides, the International Tourism Receipts continually increase from 1995 to 2016 as a whole (Figure 9). Shandong is a crucial economic province in China, which has an apparent advantage in primary and secondary industries that could solidify tourism development. SDTSA was completed in 2008, which experienced four steps[22]. And key results about tourism contribution in Shandong 2008 (Table 9). To understand well about Shandong's tourism, the author interviewed Mr. Zhang Mingchi, Deputy Director of Shandong Tourism and Culture Department, the question including the essential condition of Shandong's tourism and tourism statistics ( See Appendix ).

[21] The mainland of China has 22 provinces,5 autonomous regions, 4 municipalities.

[22] The four steps are clarifying the purpose requirement, determining the framework, sorting and compiling data, analyzing the result, respectively.

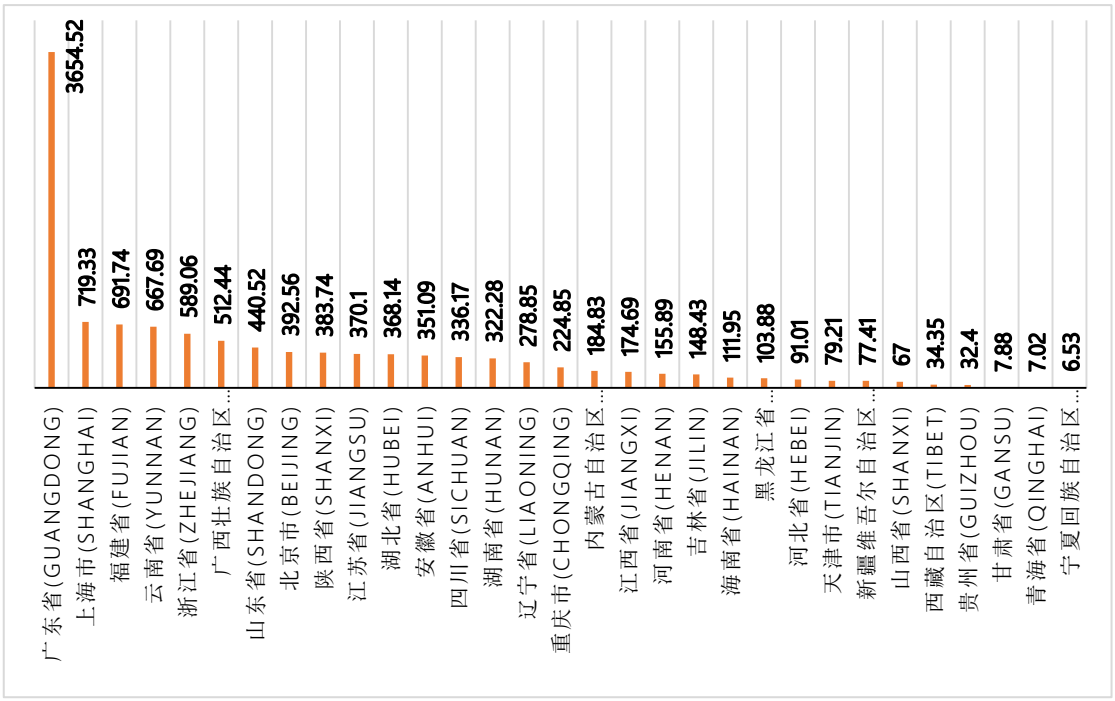


Figure 8. The Number of Visitor Arrivals in China's Mainland 2017 (Unite: Ten thousand persons).

Source: China's Tourism Statistical Yearbook 2017

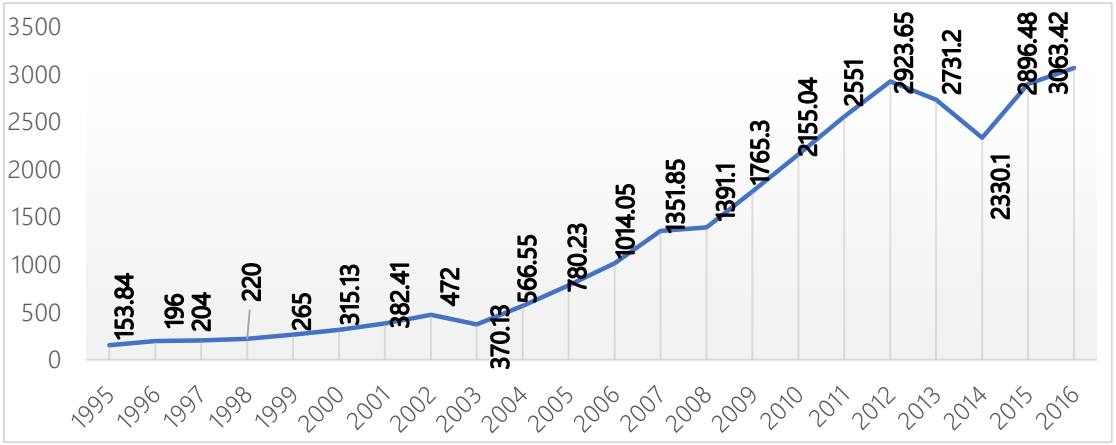


Figure 9. International Tourism Receipts 1995-2016 in Shandong (Unit: Million.US$)

Source: Shandong Statistical Yearbook 1995-2016.

Table 9. The key figures of SDTSA2008

| | Whole Province | Total tourism GSP/GDP | The percentage |
|---|---|---|---|
| GDP | 30933.27 | 1377.97 | 4.45% |
| Operating Surplus | 8261.4 | 348.16 | 4.21% |
| Remuneration for workers | 13764.53 | 664.4 | 4.83% |

Source：The compilation and research of SDTSA. Unit: billion Yuan

Queensland is located in the East-north of Australia, which is the second State in Australia with an area of 1,852,642 square kilometers. It is made up of 14 unique[23] and fabulous destinations. It does have not only beautiful coastlines but also has vast expanses of the outback. The most famous tourist spot —— Great Barrier Reef, attracts thousands of tourists from all over the world. During 2017-2018, the total tourism GDP and GVA occupied nearly half of Australia. Hence, it illustrated that Queensland occupied an important role in Australia. Table 10 below would present some critical figures of QDTSA.

Table 10. The key figures of QDTSA

| | Queensland | Australia | The percentage |
|---|---|---|---|
| Total tourism GSP/GDP (billion) | 27.3 | 60.8 | 44.90% |
| Total tourism GVA (billion) | 24.4 | 55.9 | 43.65% |
| Total tourism employment (person) | 235,900 | 666,000 | 35.42% |

Source: Australia national tourism satellite account 2017-2018, Australia State tourism satellite account 2017-2018. Unit: Billions of AU dollars

[23] Gold Cost, Brisbane, Sunshine Coast, Hervey Bay/Mary borough, Southern Downs, Toowoomba Golden West, Bundaberg, Fitzroy, MacKay, Whitsundays, Northern (Townsville), Tropical North Queensland, Outback and other

### 3.2.2 The comparison between QDTSA and SDTSA

Table 11 describes similarities and differences between QDTSA and SDTSA in the basic concept. "visitors" is the prior requirement to define the tourism activities, the most apparent differences are about defining the "usual environment" and disposing of "International student." In terms of the "usual environment," the distance restriction in QDTSA is "40 kilometers from home for overnight trips and up to 50 kilometers from home for day trips" that of SDTSA is smaller than QDTSA, which is "up to 5 kilometers". Moreover, according to TSA: RMF2008, the concept of "Tourism expenditure" is used in the first three TSA tables, while "Tourism consumption" is applied in TSA's table 4 and 6 with the same formal definition as tourism expenditure, while the concept goes beyond that of tourism expenditure. Hence, it is necessary to clarify two concepts to make the detailed classification to ensure data accuracy. Unfortunately, SDTSA combined them. Differences are also reflected in the "tourism characteristic industries" and "tourism characteristic product."

Tourism activities have a complicated relationship with other industries. Therefore, it is hard to strip the tourism proportion from other industries. Hence, the primary requirement for establishing TSA is to determine the tourism characteristic industries and related categories. Both these two regional TSA are based on the TSA: RMF 2008. While QDTSA regulated the tourism characteristic industry and tourism characteristic products, at least 25% of its output must be consumed by visitors. Therefore, it is no doubt that it specified the categories.

Meanwhile, there is also a process about SDTSA based on the unified International Standard, and it is considered that tourism activities have significance in the environmental

industries. Therefore, it regarded the environmental resource as the tourism characteristic industries. Moreover, China does not have the Central Product Classification (CPC), so some tourism products are just admitted within China. That would occur the obstruct international comparability.

## Table 11. The comparison in basic concept

| Basic concept | Similarities | Differences | |
|---|---|---|---|
| | | QDTSA | SDTSA |
| **Visitors** | 1. The length limitation of the international visitor is oneyear<br>2. Interstate/Inter-province travel: domestic overnight travel where a visitor travels to a state or territory/province other than that in which they reside. | "A traveler taking a trip to the main destination outside his/her usual environment, for less than a year, for any main purpose (business, leisure or other personal purposes) other than to be employed by a resident entity in the country or place visited. | "A traveler taking a trip to the main destination outside his / her usual environment, for up to 6 hours but less than 12 months, for the primary purpose is not to obtain remuneration." |
| | | "Usual environment" is defined by frequency and distance. (Place that is visited at least once a week and the locations up to 40 kilometers from home for overnight trips and up to 50 kilometers from home for day trips.) | "Usual environment" means the locations up to 5 kilometers from home or workplace, or a far distant place that a person frequently visited. |
| | | International student is not included in the process of investigation unless they are undertaking the short term course less than one year or travel outside their usual environment. | International student is included in the calculation whether or not exceed one year. |
| | | Visitors are being classified into national and International visitors. | Visitors are classified as visitors from outside of the province, residents in the province, and International visitors. |
| | | National and International visitors both include overnight visitors and same day visitors. | Visitors from outside of the province, residents in the province, and international visitors include overnight visitors and same-day visitors. |
| **Tourism expenditure and tourism consumption** | Measured by purchaser's price | Defined them separately. | Combining these two concepts, named as the tourism consumption |
| | | Acquisition of valuable not included in the TSA. | |
| **Tourism-characteristic industries and Tourism connected industries** | Based on TSA: RMF 2008 | Australian and New Zealand Standard Industrial Classification (ANZSIC) | National economy industry classification |
| | | Tourism characteristic industry is at least 25% of its output must be consumed by visitors | Regraded the "environmental resource" as the tourism characteristic industry |
| | | Food-and beverage-serving divided into "cafes, restaurants and takeaway food services" and "clubs, pubs, taverns and bars" | Tourism connected industries mainly are retailing and trading business |
| | | Road passenger transport divided into "taxi transport" and "other road transport" | |
| | | Regarded "casinos and other gambling services"," automotive fuel retailing" and "education and training" as the tourism characteristic industries | |
| | | Tourism connect industries are classified as "all other industries" | |
| **Tourism characteristic products** | Based on TSA: RMF 2008 | Central Product Classification (CPC) | Tourism connected products are regarded as one product is just determined in China as tourism specific product, but not admitted in the international. such as tourism shopping |
| | | Tourism characteristic product is at least 25% of total output of the product must be consumed by visitors | |
| | | All kinds of transport services emphasis on "taxi fares", "local area passenger transportation", "long distance passenger transportation" and "motor vehicle hire and lease". | |
| | | Tourism connected products are consumed by visitors but are not considered as tourism characteristic products, they are classified as "all other goods and services". | |
| **Employed person** | Employment caused by tourism consumption | Over 15 years' old | According the tourism supply ratio to apportion employed person |
| | | Specific work conditions (hours and etc.) | |

**Source:** Australia National Accounts Tourism Satellite Account 2016-2017 (Cat.No.5249.0), Tourism Satellite Account - summary of key results 2017-2018, State Tourism Satellite Account 2017-2018, The compilation and research of SDTSA.

In Table 12, it makes the comparison concerning the data source, survey method, and compilation frequency. One of the most crucial points is that the survey method is consistent at Australia's national and sub-national levels. That is why the RTSA could be reconciled with the national-level TSA[24]. Dwyer, Forsyth, Spurr, and Ho (2005) indicated that Australia's STSA adopted a hybrid approach. For instance, QDTSA's tourism expenditure data are from TRA's survey to each state, while the interstate trade was treated as if the QDTSA was a "small nation" trading with other countries or states. However, in terms of SDTSA, the data source originated from a wide range, and China does not have a standard national TSA. Based on many factors, it is challenging to classify what kind of approach was adopted in the SDTSA. Besides, Kang (2001) has introduced that the TSA could be a database, which could gather the scattered information into an integrated framework. However, SDTSA is a one-off account, so it could not form a database. Then it is hard to follow the change of the relevant information, especially the detailed information about tourism expenditure, tourism-value added, and the trend of the tourism employment. Comparing the SDTSA, QDTSA published every year.[25]

[24] The report of State tourism satellite accounts introduces the detail information about how they reconcile the State TSA data to the national Target. And in the paper named as development of regional tourism satellite account: a case study from Australia, describes the methodology about establishing the State tourism satellite account in Australia.

[25] The State Tourism satellite account published every year, it could reflect the change. For example, the tourism direct share of total state Gross value added (GVA) increased slightly from 3.0% to 3.1% during 2006-2017.

Table 12. The comparison in other aspects

| | QDTSA | SDTSA |
|---|---|---|
| **Data source** | 1. Unpublished modelled regional expenditure data from TRA's International visitor survey (IVS) and National visitor survey(NVS)<br>2. The National TSA produced by Australia Bureau of Statistics (ABS)<br>3. The I-O database from the Enormous Regional Model (TERM) | Economic census data |
| | | National Input-output table 2007 |
| | | Tourism-related departments statistical document |
| | | Existing tourism statistics data sources |
| | | Supplementary survey data |
| **Survey method** | The national level and state and territory level are in consistence. | The survey method is inconsistent with the national level and another province |
| **Compilation Approach** | Hybrid method | Indistinct |
| **Compilation frequency** | Published every year based on benchmark data, intermediate year TSA are based on actual year data. | One-off account. |

**Source:** Australia National Accounts Tourism Satellite Account 2016-2017 (Cat.No.5249.0), Tourism Satellite Account - summary of key results 2017-2018, State Tourism Satellite Account 2017-2018, The compilation and research of SDTSA.

As we could see from Table 13, SDTSA finished all ten tables according to the TSA: RMF 2008, and it also made a serious adjustment to satisfy the sub-national conditions. For example, using the "local tourist" and "tourist from outside of the province" instead of "domestic tourists," so the investigated objects more precise. On the opposite, QDTSA is not limited to 10 tables. Besides some direct aggregates and non-monetary indexes, QDTSA either includes the indirect contribution of tourism. Although this Table is relatively rough,

it could cover the shortage of the TSA[26]. Moreover, there is no unified standard for compiling RTSA, and most RTSAs are based on the national-level standard, so the form of the QDTSA is more flexible than SDTSA.

[26]According the TSA: RMF 2008, one of the limitations of TSA is the TSA just consider the tourism 's direct effect. For example, tourist bought the souvenir from the retail store, TSA just regarded the "retailing industry" is related to the tourism while ignoring other industries related to the retailing industry.

## Table 13. The comparison in TSA tables

| TSA Tables | QDTSA | SDTSA |
|---|---|---|
| 1. Inbound Tourism expenditure by products and classes of visitors | Key direct tourism aggregate result | Tourism consumption by tourist from outside of province in Shandong |
| 2. Domestic tourism expenditure by products, classes of visitors and types of trips | Direct tourism output by tourism category | Tourism consumption by residents in Shandong |
| 3. Outbound tourism expenditure by products and classes of visitors | Direct tourism GVA by tourism category | Total tourism consumption by residents |
| 4. Internal tourism consumption by products | Tourism consumption by tourism category | Total tourism consumption by tourist category |
| 5. Production accounts of tourism industries and other industries at basic prices | Direct tourism output by industry — Basic prices and state and territory share of total | Production accounts of tourism industries and other industries |
| 6. Total domestic supply and internal tourism consumption (at purchaser's prices) | Direct tourism gross value added by industry — basic priced and state and territory share of total | Total domestic supply and internal consumption |
| 7. Employment in the tourism industries | Direct tourism employment by industry and state and territory share | Employment in the tourism industries |
| 8. Tourism gross fixed capital formation of tourism industries and other industries | Tourism consumption by product — purchaser's prices and state and territory share of total | Tourism gross fixed capital formation of tourism industries and other industries |
| 9. Tourism collective consumption by products and levels of government. | Indirect contribution of tourism | Tourism collective consumption, by product and level of government |
| 10. Non-monetary indicators | Total effects of tourism consumption | Non-monetary indicators |
| 11 | State and territory totals of key economic aggregates | |
| 12 | Key direct tourism aggregate results, Domestic | |
| 13 | Key direct tourism aggregate results, International | |
| 14 | Tourism shares in state and territory economy | |
| 15 | Industry shares of key economic aggregates | |

Source: Australia National Accounts Tourism Satellite Account 2016-2017 (Cat.No.5249.0), Tourism Satellite Account - summary of key results 2017-2018, State Tourism Satellite Account 2017-2018, The compilation and research of SDTSA.

When the QDTSA and SDTSA were compared, it was determined that the SDTSA makes use of data from numerous departments and supplemental surveys, whereas the QDTSA makes use of data from a single department and additional surveys. Due to the distributed nature of the data, collecting and maintaining it is a massive task. It is far more straightforward to generate a data problem during the data preparation and sorting processes. Due to the fact that SDTSA is a one-time account, it cannot be used to establish a database, making it difficult to follow changes in critical data, notably precise information about tourism expenditure, tourism value-added, and employment trends in tourism. Compared to the SDTSA, the QDTSA is released annually, and its tables are more customizable, as opposed to the ten tables included in the SDTSA. There are two possible development paths for RTSA, and Australia picked the hybrid approach. Due to the complexity of the SDTSA compilation process, it is impossible to establish which technique is used.

# Chapter 4 The analysis of tourism industry economy using Shandong RTSA in 2012 and 2017

According to TSA: RFM 2008, TSA is mainly based on a country's SNA. To begin, developing TSA requires that the framework's basic concepts and categories are precisely defined and split, most notably tourism demand and supply. Following that, data inquiry, collecting, and processing are carried out to construct TSA tables and calculate various indicators based on the defined concept system (Y.-J. Ma, 2007). For the direct economic contribution of tourism, TSA is by far the most scientific accounting method. However, many TSA's special investigations are difficult to carry out due to capital and time constraints. According to the research progress of China's TSA, the goal of establishing China's RTSA should be to follow the international standards and combine with the actual situation of China. China's RTSA should both internationally comparable and fully reflects the actual status of China's tourism. Therefore, Y.-L. Ma (2017) proposed a method to quickly calculate the direct economic contribution of tourism by separating the data of tourism characteristic industries from the industries in the input-output table using the input-output table data. Similarly, Yan and Xiong (2017)used a similar method to calculate the economic contribution of China's tourism industry in 2002 and 2007. Before that, X.-J. Yang (2016) pointed to using input-output models as one form of China's localized TSA. Further, TSA: RFM 2008 para.4.13 stated that the extraction of detailed data referring to tourism-related products and tourism industries from the surveys, administrative records, and other databases is used to compile the I-O tables when the detail available in the tables is not sufficient. The establishment of TSA and calculation of Tourism Value Added mainly include determining the tourism industry, determining relevant concepts, establishing

tables, and calculating indicators. It is vital to clarify the definition and concepts in TSAs, and It is also the basis of the tourism economic accounting(Suich, 2010). Since the third chapter has compared the definition of relevant concepts in SDTSA with TSA: RFM2008 and QDTSA, this chapter will describe how to determine the tourism characteristic industries. TSA: RFM 2008 has mainly established ten tables (see Appendix). For sub-national purposes, ten tables could be reduced from ten to five for assessing the economic contribution. Table 4: Domestic Tourism Consumption by Product, Table 5: Production Accounts of Tourism industries and other industries, Table 6: Total Domestic supply and Internal Tourism Consumption, Table 7: Employment in the Tourism Industries, and Table 10: Non-monetary Industries (Frechtling, 2009). The calculations in this chapter mainly refer to the creation of Tables 4, 5, and 6.

## 4.1 The economic characteristics and statistical classification of the tourism sector

### 4.1.1 The relevant definition of economic characteristics of the tourism sector

1） Tourism

What is "tourism"? One of the oldest conceptual definitions was proposed by Hunziker and Krapf (1942). It is ' a sum of relations and phenomena resulting from travel and stay of non-residents, in so far as a stay does not lead to permanent residence and is not connected with any permanent or temporary earning activity' (Norbert 2017). This definition was generally accepted for a considerable time. Latterly, a more straightforward definition

based on Burkart and Medlik (1981) still is applied today. It listed five characteristics of tourism:

1.Tourism is an amalgam of phenomena and relationships rather than a single one.

2 . These phenomena and relationships arise from a movement of people to, and a stay in, various destinations; there is a dynamic element (the journey) and a static element (the stay).

3. The journey and stay are to and in locations other than one's usual house and place of employment. Thus, tourism generates activities that are separate from those carried out by the resident and working populations of the cities and towns through which tourists go and their destinations.

4 . The movement to the destinations is of a temporary, short-term character

5. Destinations are visited for purposes not connected to paid work - that is, not to take up employment.

Gilbert (1990) defines tourism as one part of recreation, which involves travel to a less familiar destination or community, for a short-term period, to satisfy a consumer need for one or a combination of activities'. However, there is also no standard definition to explain what tourism is. Many scientists and organizations were aware of this problem. Therefore, in 2001, the definition of tourism was reformulated, which was accepted worldwide:

'*Tourism comprises the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes not related to the exercise of an activity remunerated from within the place visited, where the persons referred to in the definition of tourism are termed 'visitors.' A visitor being defined as any person traveling to a place other than that of his/her usual*

*environment for less than twelve months and whose main purpose of the trip is other than the exercise of an activity remunerated from within the place visited.*'

2） Tourism industry

Usually, Norbert (2017) described an industry or an economic sector that comprises firms that produce the same products or services, the same group of products and services，and/or based on the same raw materials (leather, rubber, etc.). The SNA defines industry as groups of establishments engaged in the same kind of productive activities.

These standards mean that some old industries will disappear with the development of the social economy and technology, and new industries will continue to appear. Therefore, the number of enterprises and their output scale are significant. "Homogeneous products" and "same technology" are the core of determining whether a unified enterprise group is considered an industry. Therefore, Smith (2004) believes that although the term "tourism industry" is often used in policy analysis, tourism promotion, education, and destination impact, tourism is not an industry in this sense. It mainly includes the following two aspects: on the one hand, there are apparent differences between the products of accommodation enterprises and the products of transportation companies, which do not meet the standards of homogeneous products. On the other hand, tourism is a demand-side concept characterized by the activities of a particular class of consumers, and industry is defined in terms of products rather than consumers of products. In general, researchers' opinion falls into two categories. One says, "The tourism industry is a series of interrelated businesses that serve tourists. The other viewpoint maintains that tourism is an industry in which tourists are connected to accommodation, catering, and transportation units. They guide tourists, negotiate with them, handle formalities on their behalf, and provide services to tourists using their mode of transportation and accommodation equipment (L.-Y. Zhang,

2000). Y. Yang (2018) points out that the following reasons lead to the controversy about the tourism industry: 1. There is a lack of credible measurement methods to describe the scale and influence of tourism; 2. Tourism is highly diversified, but some researchers doubt whether tourism is a single industry or an interrelated industry. 3. Complexity of spatial areas; 4. High dispersion of industries.

The components of a tourism product originate from different sectors of national accounts, and some of them serve tourists exclusively, and others serve tourists and non-tourists, increasing the difficulty to measure the importance of tourism. The complexity of tourism created the need for a TSA. TSA: RFM2008 defines the 'tourism industries' comprising all establishments for which the principal activity is a tourism characteristic activity. Therefore, 'Tourism industries' are equivalent to 'tourism characteristic activities.'

'A tourism industry represents the grouping of those establishments whose main activity is the same tourism characteristic activity. In supply-side statistics, establishments are classified according to their main activity, which is determined by the activity that generates the most value-added.' Thus, tourism characteristic activities are those that typically produce tourism characteristic products. IRTS 2008, para. 5.18 presents the typology of tourism characteristic consumption products and activities, each of them grouped in the 12 corresponding categories to be used in the Tourism Satellite Account.

**Table 14. The categories of tourism products and activities**

| Products | Activities |
|---|---|
| 1.Accomodation services for visitors | 1.Accommodation for visitors |
| 2.Food-and beverage-serving services | 2. Food- and beverage-serving activities |
| 3.Railway passenger transport services | 3.Railway passenger transport |
| 4.Road passenger transport services | 4.Road passenger transport |
| 5.Water passenger transport services | 5.Water passenger transport |
| 6.Air passenger transport services | 6.Air passenger transport |
| 7.Transport equipment rental services | 7.Transport equipment rental |
| 8.Travel agencies and other reservation services | 8.Travel agencies and other reservation activi |
| 9.Cultural services | 9.Cultural activiteis |
| 10.Sports and recreational services | 10. Sports and recreational activites |
| 11.Country-specific tourism characteristic goods | 11.Retail trade of country-specific tourism characteristic goods |
| 12.Country-specific tourism characteristic services | 12.Other country-specific tourism characteristic activities |

Source: TSA: RFM 2008

### 4.1.2 The classification of the tourism products and industries of RTSA

Typically, identifying tourism characteristic industries and tourism characteristic products is the first step to developing TSA. This paper, to optimize the calculation method, takes advantage of the I-O table. Jian Li (2006) indicated that SNA and its I-O tables provide a basic framework for constructing TSA. The I-O table forms the basis of the TSA in three respects:

1. The I-O table provides detailed measures of the output of various goods and industries. These measures will be used to identify the goods purchased by tourists.
2. The I-O table provides detailed measures of expenditure by industry and end-user, which are needed to identify tourism expenditure by category of tourist.

3. The I-O table provides an analytical framework by which expenditure on industrial output is linked to the gross national economy (GDP), which is essential for tourism analysis.

Thus, to calculate the contribution of tourism, it is necessary to link the classification of the tourism industries with the I-O table.

This chapter bases on TSA: RFM2008 and *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*. Shandong Input-output table 2012 (42 sectors, 139 Commodities), and Shandong Input-Output table2017 (42 sectors,141 Commodities) to select for sectors directly related to tourism. These sectors include both tourism-related and non-tourism-related activities. This chapter tries to separate tourism-related activities from these departments. The separated tourism-related activities can be called Tourism characteristic industries, which is also the object of analysis in this chapter. As the content described above,

Table 15 shows the correspondence between the tourism industries and the tourism-related sector of Shandong I-O table 2012 and 2017.

Table 15: correspondence between the tourism industries and the tourism-related sector of Shandong I-O table 2012 and 2017

| Classification of 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 Determining the relevant definition of RTSA

TSA has adopted several total indicators. This chapter mainly focuses on two concepts of Value-Added: "Value-Added of the Tourism Industries" (herein VATI) and "Tourism Value-Added." (herein TVA). VATI refers to the Value-Added of all industries that provide tourism characteristic products. To understand this concept, it firstly makes clear the tourism characteristic industries. TSA：RFM2008 defines "tourism industry" as "A tourism industry represents the grouping of those establishments whose main activity is the same tourism characteristic activity." Therefore, it can be seen that the VATI is the total Value-Added of all production activities with tourism characteristics, that is, industries whose products are consumed mainly by tourists. It does not consider whether the output of these tourism characteristic activities or products is provided to tourists, nor does it consider the degree of specialization of its production process. In other words, when calculating the VATI, It does not take into account the fact that not all the production of characteristic activities is provided to the tourist, and it does not take into account the production of non-characteristic activities obtained by the tourist.

The tourism value added (TVA) refers to the added value generated by the tourism industry and other industries in the economy in response to domestic tourism consumption. It does not include the added value generated by the services provided to non-tourists. It is an important indicator of TSA. For further clarification, this chapter cites an accurate discussion of TSA: RFM 2008 para 4.91

'*Comparing this measurement with VATI, the latter would include, for instance, all the gross value added generated by restaurants, including meals consumed by residents because these establishments are part of the tourism industry. In contrast, TVA would*

*include the part of gross value added generated by meals served by restaurants to visitors, it would exclude the part of gross value added corresponding to meals served by these same restaurants to locals. It would also exclude the part of gross value added generated by restaurants in any other secondary activity, such as catering to local businesses and the rental of space to third parties and in any other output in as much as it is not delivered to visitors.*'

In addition to the different understanding of the TVA and the VATI, there are also two related concepts in studying the value-added of tourism: direct value-added and indirect value-added. Direct value added is associated with the consumption of goods and services. With the input and production generated by the direct added value, the added value is generated again, so the concept of indirect added value appears(Kang, 2011).

## 4.3 Data and theoretical preparation

### 4.3.1 The demand data

Since the last tourism sample survey in Shandong was in 2001, the data in "Shandong Tourism Satellite Account in 2008" are used in this chapter to show the proportion of tourism expenditure. To compile SDTSA2008, the compilation team specially designed and carried out a survey on the composition of tourism expenditure to make the data more reliable. On this basis, according to the *Shandong Statistical Yearbook 2012* and *Shandong Statistical Yearbook 2017*, the tourism income of that year is distributed according to the proportion of tourism expenditure.

### 4.3.2 The supply data

In this chapter, the input-output table of Shandong in 2012 and 2017 are taken as the basic data sources.

### 4.3.3 Data sorting

They used the input-output table as the data basis of table 4 of the TSA, which needs to undergo specific data processing. Because China's input-output table is based on producer prices, the data required in table 4 of the TSA are consumption data based on consumer prices. The consumption data is based on sales price, while the supply side data obtained through the input-output table is calculated by production price, the difference between the two is mainly tax, namely the enterprise income tax, value-added tax, or business tax mentioned above. However, due to the complexity of the tax rate, this issue has been ignored in the regional tourism satellite accounts previously compiled. Therefore, the tax rate is not dealt with in this chapter, which will be future research. It is one of the limitations of this paper.

### 4.3.4 Theoretical preparation

1) TSA

In the previous chapters, the article describes the details of the TSA. In this chapter, the tourism characteristic industries are determined by using the TSA, and the direct and indirect contribution of tourism is calculated according to the related information.

2) Input-output analysis

TSA bases on the input-output theory. The input-output theory is an economic quantitative analysis method known as input-output analysis and industrial correlation method established by the American economist Leontief. Leontief created the input-output table to reveal the rule of the interdependent relationship between various industries. Later, through the joint efforts of economists from all over the world, the present relatively perfect input-output table has been formed. An input-output table is an essential tool of correlation analysis in the national economy industry. It is the economic activity of a country or region as a whole. The input-output model is established and calculated by analyzing each industry's input and output, balanced relation, direct consumption coefficient, etc. Input-output analysis can clearly show the complexity of interrelation among various social economy sectors, which is essentially a static balance analysis of economics. The tourism industry, as a comprehensive industry, is linked with several industries. The development of the tourism industry needs the support of many basic industries. The tourism industry also has a leading effect at the same time. By analyzing the economic contribution of the tourism industry, we must fully consider the tourism industry and relevant industries of dependency and influence. As an effective method to analyze the impact of the tourism industry, input-output has been widely used in the research and practice of the economic effect of the tourism industry in the world.

3) Stripping coefficient

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：

$$Industry\ value\ added = Total\ production \times Value\ added\ rate \quad (1)$$

$$Tourism\ value\ added = Tourism\ expenditure \times Value\ added\ rate \quad (2)$$

$$Tourism\ stripping\ coefficient = \frac{Tourism\ value\ added}{Industry\ value\ added} \quad (3)$$

## 4.4 The calculation method and process

The calculation of Direct tourism value-added, firstly, using the secondary data from Shandong input-output table 2012 (Shandong I-O table 2012) and Shandong Input-Output table 2017 (Shandong I-O table 2017) to determine the total production of each tourism industry in Shandong 2012 and 2017. 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. During the process of calculating the direct tourism value-added, it takes the

Because of the lack of data resources, this paper makes some hypotheses and rearrangements data to estimate the direct tourism contribution to Shandong's economy in 2012 and 2017. The methodological procedure would be shown in Figure 10.

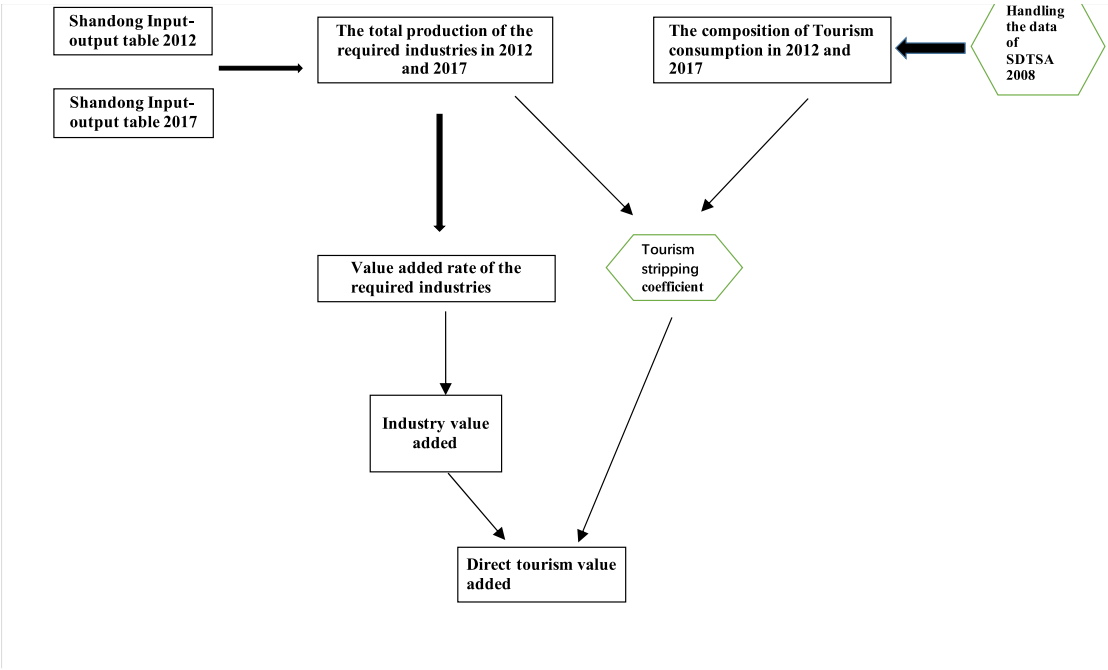


Figure 10.The methodological procedure

1) Calculating the value-added of tourism characteristic industries

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

$$Value\ added\ rate = \frac{Total\ production - Intermediate\ input}{Total\ production} \quad (4)$$

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, 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 16, column 3. According to the Shandong yearbook 2013 and 2018, the total tourism expenditure is 4519.7 and 9200.3 million yuan in 2012 and 2017. Accommodation and food and beverage accounted for 211.3 million and 328.9 million in 2012. Moreover, 213.1 million and 281.5 million in 2017; the specific figures are shown in the Shandong yearbook 2013 and 2018. Hence, according to the tourism expenditure proportion 2008 to arrange the total tourism amount in 2012 and 2017, Table 16 shows the tourism expenditure component in 2012 and 2017.

The calculation method：

$$Industry\ value\ added = Total\ production \times Value\ added\ rate \quad (5)$$

$$Tourism\ value\ added = Tourism\ expenditure \times Value\ added\ rate \quad (6)$$

$$Tourism\ stripping\ coefficient = \frac{Tourism\ value\ added}{Industry\ value\ added} \quad (7)$$

Therefore, after the calculation, the tourism stripping coefficient in 2012 shows in table 17, and the tourism stripping coefficient in 2017 shown in table 18. As can be seen from table and 7, air passenger services are usually trans-regional airlines, and the consumption expenditure of tourists may not be provided by the supplier in Shandong, which leads to the consumption expenditure of these passenger services exceeding the supply. Therefore, 100% proportion is used for the analysis of air services. Such a situation occurs in preparing the Jiangsu tourism satellite account and other regional tourism satellite accounts. One of the difficulties in establishing an RTSA is that the region is a relatively open economy, and it is difficult to maintain the balance of supply and demand in the economy.

## Table 16. Tourism expenditure component in 2012 and 2017

| Tourism expenditure component in 2012 and 2017 ( 10 thousand Yuan) | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Tourism expenditure in 2008 (1) | Total amount in 2008 (2) | Tourism expenditure proportion (3) | 2012 Tourism Revenue | Tourism Expenditure component in 2012 | 2017 Tourism Revenue | Tourism Expenditure component in 2017 |
| Accomodation for visitors | 2427586.6 | 27370769.7 | 8.87% | 39794479.000 | 2113202.000 | 87056506.000 | 2131261.000 |
| Food-and beverage-serving activities | 4682244 | | 17.11% | | 3289319.000 | | 2815233.000 |
| Railway passenger transport | 897774.2 | | 3.28% | | 1305277.745 | | 2855494.598 |
| Road passenger transport | 4867533.5 | | 17.78% | | 7076927.751 | | 15481861.27 |
| Water passenger transport | 715850.8 | | 2.62% | | 1040778.536 | | 2276862.147 |
| Air passenger transport | 1023739.4 | | 3.74% | | 1488419.087 | | 3256144.281 |
| Transport equipment rental | 57954.5 | | 0.21% | | 84260.29514 | | 184332.2761 |
| Travel agencies and other reservation services activities | 2812329.5 | | 10.27% | | 4088857.875 | | 8945001.645 |
| Cultural, sports and recreational activities | 1030341 | | 3.76% | | 1498017.182 | | 3277141.58 |
| Travelling shopping | 6984294.8 | | 25.52% | | 10154496.05 | | 22214512.37 |
| Financial and Insurance | 643582.6 | | 2.35% | | 935707.4916 | | 2047003.175 |
| Post and communication | 417481.7 | | 1.53% | | 606978.4272 | | 1327858.095 |
| Residents service, repair and other services | 810057.2 | | 2.96% | | 1177745.624 | | 2576498.588 |

## Table 17. The Calculation table of tourism stripping coefficient in 2012

| The calculation table of tourism stripping coefficient in 2012 Unit :10 thousand Yuan | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Tourism expenditure | Total Production | Intermediate input | Industry Value added ratio | Industry value added | Tourism value added | Stripping coefficient |
| Accomodation for visitors | 2113202.000 | 3326310.464 | 1937001.372 | 0.418 | 1389309.092 | 882626.797 | 0.635 |
| Food-and beverage-serving activities | 3289319.000 | 14396389.598 | 5190981.751 | 0.639 | 9205407.848 | 2103271.986 | 0.228 |
| Railway passenger transport | 1305277.745 | 2496879.000 | 1050222.539 | 0.579 | 1446656.461 | 756259.508 | 0.523 |
| Road passenger transport | 7076927.751 | 20067011.284 | 6825914.755 | 0.660 | 13241096.529 | 4669668.151 | 0.353 |
| Water passenger transport | 1040778.536 | 7076694.773 | 2689941.280 | 0.620 | 4386753.494 | 645165.438 | 0.147 |
| Air passenger transport | 1488419.087 | 1036994.341 | 698274.863 | 0.327 | 338719.478 | 486170.962 | 1.435 |
| Transport equipment rental | 84260.295 | 625446.019 | 112601.876 | 0.820 | 512844.144 | 69090.533 | 0.135 |
| Travel agencies and other reservation services activities | 4088857.875 | 15033098.997 | 8926856.533 | 0.406 | 6106242.464 | 1660839.032 | 0.272 |
| Cultural, sports and recreational activities | 1498017.182 | 2614641.360 | 958804.392 | 0.633 | 1655836.968 | 948685.455 | 0.573 |
| Travelling shopping | 10154496.048 | 81884447.743 | 16810458.732 | 0.795 | 65073989.011 | 8069829.894 | 0.124 |
| Financial and Insurance | 935707.492 | 38872904.702 | 19511839.336 | 0.498 | 19361065.366 | 466039.110 | 0.024 |
| Post and communication | 606978.427 | 11349958.109 | 1230718.493 | 0.892 | 10119239.616 | 541161.482 | 0.053 |
| Residents service, repair and other services | 1177745.624 | 10473249.505 | 4473433.960 | 0.573 | 5999815.545 | 674695.709 | 0.112 |

Note: The stripping coefficient of Air passenger transport large than 1 should be adjusted to 1

## Table 18. The Calculation table of tourism stripping coefficient in 2017

| The calculation table of tourism stripping coefficient in 2017 Unit :10 thousand Yuan | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Tourism expenditure | Total Production | Intermediate input | Industry Value added ratio | Industry value added | Tourism value added | Stripping coefficient |
| Accomodation for visitors | 2131261.000 | 9250977.991 | 5265842.980 | 0.431 | 3985135.010 | 918104.317 | 0.230 |
| Food-and beverage-serving activities | 2815233.000 | 24234779.627 | 11566045.667 | 0.523 | 12668733.960 | 1471663.389 | 0.116 |
| Railway passenger transport | 2855494.598 | 5844714.356 | 2680242.139 | 0.541 | 3164472.217 | 1546035.062 | 0.489 |
| Road passenger transport | 15481861.270 | 45504099.387 | 28984067.222 | 0.363 | 16520032.166 | 5620611.101 | 0.340 |
| Water passenger transport | 2276862.147 | 10319175.093 | 5797989.469 | 0.438 | 4521185.624 | 997571.639 | 0.221 |
| Air passenger transport | 3256144.281 | 2515650.776 | 1959903.149 | 0.221 | 555747.627 | 719334.525 | 1.294 |
| Transport equipment rental | 184332.276 | 4960666.523 | 3021840.816 | 0.391 | 1938825.707 | 72044.382 | 0.037 |
| Travel agencies and other reservation services activities | 8945001.645 | 57515063.769 | 36024127.267 | 0.374 | 21490936.502 | 3342367.195 | 0.156 |
| Cultural, sports and recreational activities | 3277141.580 | 9623675.497 | 5115989.268 | 0.468 | 4507686.229 | 1534998.346 | 0.341 |
| Travelling shopping | 22214512.373 | 127792868.215 | 34955578.004 | 0.726 | 92837290.211 | 16138108.181 | 0.174 |
| Financial and Insurance | 2047003.175 | 66448323.279 | 29932732.744 | 0.550 | 36515590.535 | 1124897.154 | 0.031 |
| Post and communication | 1327858.095 | 69131261.002 | 11315555.605 | 0.836 | 57815705.397 | 1110511.386 | 0.019 |
| Residents service, repair and other services | 2576498.588 | 25472461.163 | 4242770.169 | 0.833 | 21229690.994 | 2147349.191 | 0.101 |

Note: The stripping coefficient of Air passenger transport large than 1 should be adjusted to 1

3) Calculation of the direct tourism value-added

Finally, the formula to calculate the tourism value added is

$$Direct\ tourism\ value\ adde$$

$$= Industry\ Value\ added \times \quad Tourism\ Stripping\ coefficient \qquad (8)$$

After the calculation, the total direct tourism value added is 2182.61 million 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 4.36 % of the total GDP. Furthermore, the direct tourism value added is 3658.00 million Yuan, which accounted for 5.03% of the total GDP.

## 4.5 Indirect tourism value added of tourism

When calculating the indirect Tourism value-added of Shandong, it is necessary to consider the complete consumption relation in the I-O table. Therefore, an I-O table including tourism characteristic industries should be established to analyze the relationship between tourism characteristic industries and other industries. The specific process is mainly divided into two steps ( shown in figure 11).

1) Multiply the intermediate input (consume) of the tourism characteristic industries mentioned above with the corresponding tourism stripping coefficient, and then add all the indicators of the same sector to get the intermediate input (consume) of the tourism characteristic industries. Then, the part of tourism characteristic industries should be subtracted from the corresponding sector. For instance, the Food and tobacco industry needs 100 RMB wholesale and retail, but 5 RMB belongs to tourism characteristic industries. Therefore, it needs to deduct 5 RMB from wholesale and retail to Tourism characteristic industries.

2) Add the total input of the eight tourism characteristic industries mentioned above according to the proportion of the corresponding tourism stripping coefficient. Then, finally, get the total input (production) of tourism characteristic tourism industries.

Thus, the I-O tables of 43 departments, including tourism characteristic industries, are obtained, as shown in the Appendix 2.

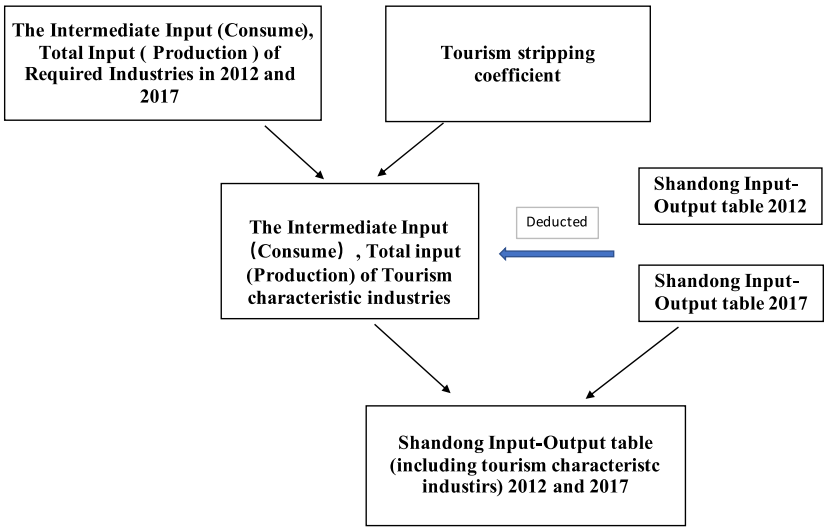


Figure 11. The process of making the Shandong I-O table 2012 and 2017 ( including tourism characteristic industries)

Yan and Xiong (2017) described the formula of the indirect tourism value-added shown as the following:

$$\mathrm{RGDP}_2\& = Z_r\left(\sum_{j=1}^{n} X_{rj} - \mathrm{RGDP}_1\right) \tag{9}$$

$$X_{rj}\& = [(I - A)^{-1} - I]X_j \tag{10}$$

$\mathrm{RGDP}_2$represents the total indirect tourism value-added; $n$ represent the number of departments; $X_{rj}$ represents the Indirect Value added of each department j, which is equal to the total consumption coefficient of each department to tourism multiplied by the total

output of each department$X_j$; $Z_r$ represents the comprehensive value-added rate of tourism characteristic industries[27], which is the ratio of direct value-added of tourism characteristic industries to total output value; $RGDP_1$ is direct tourism added value; $\sum_{j=1}^{n} X_{rj}$ is the total tourism value-added driven by the input-output relationship of all departments.

According to the reclassified input-output tables of 2012 and 2017, the corresponding complete consumption coefficients are calculated in Table 19.

**Table 19. Complete consumption coefficients in 2012 and 2017**

| Department | 2012 | Department | 2017 |
|---|---|---|---|
| Agricultural, forestry, animal husbandry and fishery products and services | 0.082565 | Agricultural, forestry, animal husbandry and fishery products and services | 0.079711 |
| Coal mining and selection products | 0.051056 | Coal mining and selection products | 0.017314 |
| Oil and gas extraction products | 0.133713 | Oil and gas extraction products | 0.032916 |
| Metal mining and dressing products | 0.028929 | Metal mining and dressing products | 0.014783 |
| Non-metallic ore and other mineral mining and dressing products | 0.004183 | Non-metallic ore and other mineral mining and dressing products | 0.001621 |
| Food and tobacco | 0.089184 | Food and tobacco | 0.123236 |
| Textile | 0.030439 | Textile | 0.040311 |
| Textile, clothing, shoes, hats, leather, down and their products | 0.017317 | Textile, clothing, shoes, hats, leather, down and their products | 0.018870 |
| Wood products and furniture | 0.013389 | Wood products and furniture | 0.028194 |
| Paper printing and cultural and educational sports goods | 0.077471 | Paper printing and cultural and educational sports goods | 0.105021 |
| Petroleum, coking products and processed nuclear fuel products | 0.215152 | Petroleum, coking products and processed nuclear fuel products | 0.159994 |
| Chemical products | 0.182100 | Chemical products | 0.173953 |
| Non-metallic mineral products | 0.040210 | Non-metallic mineral products | 0.015563 |
| Metal smelting and calendering products | 0.145415 | Metal smelting and calendering products | 0.064139 |
| Metal products | 0.052884 | Metal products | 0.036641 |
| General equipment | 0.054760 | General equipment | 0.040070 |
| Special equipment | 0.023031 | Special equipment | 0.019161 |
| Traffic and transportation equipment | 0.114989 | Traffic and transportation equipment | 0.194569 |
| Electrical machinery and equipment | 0.050621 | Electrical machinery and equipment | 0.042133 |
| Communication equipment, computers and other electronic equipment | 0.088227 | Communication equipment, computers and other electronic equipment | 0.118475 |
| Instrument and meter | 0.009186 | Instrument and meter | 0.007624 |
| Other manufactured products | 0.005188 | Other manufactured products and Scrap waste | 0.018532 |
| Scrap waste | 0.003986 | Metalwork, machinery and equipment repair services | 0.001253 |
| Metalwork, machinery and equipment repair services | 0.003578 | Production and supply of electricity and heat | 0.030440 |
| Production and supply of electricity and heat | 0.091585 | Gas production and supply | 0.030183 |
| Gas production and supply | 0.002894 | Water production and supply | 0.004630 |
| Water production and supply | 0.000631 | Building | 0.001608 |
| Building | 0.018200 | Wholesale and Retail | 0.381896 |
| Wholesale and Retail | 0.139889 | Transportation, warehousing and postal services | 0.680950 |
| Transportation, warehousing and postal services | 0.495082 | Accommodation and Meals | 0.102141 |
| Accommodation and Meals | 0.095004 | Information transmission, software and information technology services | 0.003153 |
| Information transmission, software and information technology services | 0.014566 | Financial | 0.097518 |
| Financial | 0.061612 | Real estate | 0.004732 |
| Real estate | 0.023360 | Rental and commercial services | 0.229313 |
| Rental and commercial services | 0.174455 | Scientific research | 0.000000 |
| Scientific research and technical services | 0.003138 | Technical services | 0.009439 |
| Water conservancy, environment and public facilities management | 0.000410 | Water conservancy, environment and public facilities management | 0.019093 |
| Resident services, repairs and other services | 0.021711 | Resident services, repairs and other services | 0.055933 |
| Education | 0.000860 | Education | 0.017940 |
| Health and social work | 0.002430 | Health and social work | 0.000445 |
| Culture, sports and entertainment | 0.018270 | Culture, sports and entertainment | 0.044211 |
| Public administration, social security and social organization | 0.001380 | Public administration, social security and social organization | 0.000006 |
| Tourism characteristic industies | 0.135516 | Tourism characteristic industies | 0.254172 |

[27] Direct tourism value added divide the total tourism output

The total consumption of tourism characteristic industries can be obtained by multiplying the total output of each sector by the total consumption coefficient of each sector on generalized tourism. According to the interpretation of the input-output table, such total consumption represents the indirect contribution of this department to the tourism characteristic industries. Therefore, it obtained indirect output of tourism in various sectors as shown in Table 20.

**Table 20. The indirect output of tourism in various sectors**

| Department | 2012 | Department | 2017 |
|---|---|---|---|
| Agricultural, forestry, animal husbandry and fishery products and services | 6560437.682622 | Agricultural, forestry, animal husbandry and fishery products and services | 7285830.234917 |
| Coal mining and selection products | 1055194.830317 | Coal mining and selection products | 430741.859085 |
| Oil and gas extraction products | 1611484.643805 | Oil and gas extraction products | 263222.433923 |
| Metal mining and dressing products | 286570.686033 | Metal mining and dressing products | 243056.284156 |
| Non-metallic ore and other mineral mining and dressing products | 22929.258807 | Non-metallic ore and other mineral mining and dressing products | 12584.570221 |
| Food and tobacco | 13723651.785339 | Food and tobacco | 24434873.714572 |
| Textile | 2242668.462222 | Textile | 3864775.579103 |
| Textile, clothing, shoes, hats, leather, down and their products | 587607.516269 | Textile, clothing, shoes, hats, leather, down and their products | 824515.804631 |
| Wood products and furniture | 366921.045753 | Wood products and furniture | 1209297.685087 |
| Paper printing and cultural and educational sports goods | 3593686.957550 | Paper printing and cultural and educational sports goods | 8292859.613899 |
| Petroleum, coking products and processed nuclear fuel products | 14823697.894735 | Petroleum, coking products and processed nuclear fuel products | 17622260.235742 |
| Chemical products | 38736696.949304 | Chemical products | 55749678.172092 |
| Non-metallic mineral products | 2875184.794190 | Non-metallic mineral products | 1499470.799403 |
| Metal smelting and calendering products | 16709674.439761 | Metal smelting and calendering products | 8551207.727310 |
| Metal products | 2447287.569303 | Metal products | 2672384.734062 |
| General equipment | 3788664.573043 | General equipment | 3936169.788049 |
| Special equipment | 1305809.127723 | Special equipment | 1365206.858643 |
| Traffic and transportation equipment | 7662057.568843 | Traffic and transportation equipment | 20642229.923220 |
| Electrical machinery and equipment | 2631335.543864 | Electrical machinery and equipment | 2926813.339899 |
| Communication equipment, computers and other electronic equipment | 3867571.736528 | Communication equipment, computers and other electronic equipment | 8251058.780044 |
| Instrument and meter | 50036.891377 | Instrument and meter | 82448.729382 |
| Other manufactured products | 22287.740463 | Other manufactured products and Scrap waste | 72481.616052 |
| Scrap waste | 2745.609797 | Metalwork, machinery and equipment repair services | 1741.553760 |
| Metalwork, machinery and equipment repair services | 2574.422977 | Production and supply of electricity and heat | 1268909.738956 |
| Production and supply of electricity and heat | 4264833.947388 | Gas production and supply | 145816.162297 |
| Gas production and supply | 5134.141516 | Water production and supply | 17844.882735 |
| Water production and supply | 433.670541 | Building | 250941.901161 |
| Building | 1843503.623919 | Wholesale and Retail | 48803634.400290 |
| Wholesale and Retail | 11454760.571386 | Transportation, warehousing and postal services | 68048733.679443 |
| Transportation, warehousing and postal services | 24137278.423515 | Accommodation and Meals | 3420277.969952 |
| Accommodation and Meals | 1683731.236867 | Information transmission, software and information technology services | 55593.898628 |
| Information transmission, software and information technology services | 149413.270550 | Financial | 6479906.861359 |
| Financial | 2395041.742924 | Real estate | 222163.636457 |
| Real estate | 583799.058730 | Rental and commercial services | 14326475.768797 |
| Rental and commercial services | 2731708.148412 | Scientific research | 0.000000 |
| Scientific research and technical services | 23196.993187 | Technical services | 221418.484924 |
| Water conservancy, environment and public facilities management | 1482.296643 | Water conservancy, environment and public facilities management | 165754.615992 |
| Resident services, repairs and other services | 227389.693494 | Resident services, repairs and other services | 1424758.640012 |
| Education | 12441.270111 | Education | 551984.275972 |
| Health and social work | 33014.351086 | Health and social work | 16563.760077 |
| Culture, sports and entertainment | 47769.307338 | Culture, sports and entertainment | 425473.467151 |
| Public administration, social security and social organization | 36282.092170 | Public administration, social security and social organization | 290.639088 |

In calculating indirect tourism output, the eight tourism-related industries proposed previously have covered tourism characteristic industries. Therefore, their complete

demand for themselves should be excluded in the calculation of indirect tourism value-added. Finally, after adjustment in 2012 and 2017, the indirect tourism output of Shandong is 15278.1939 and 27950.14439 billion Yuan. In calculating indirect tourism value-added, this chapter adopts the added value rate of tourism characteristic industries[28], and the results are 0.104 and 0.080, respectively. Therefore, it was finally concluded that the indirect value added of tourism in 2012 was 1588.932 billion yuan, which accounted for 3.18% of the total GDP. Moreover, in 2017, it was 2236,012 billion yuan, which accounted for 3.08% of the total GDP.

## 4.6 Analysis on the correlation and other effects of tourism characteristic industries in Shandong province

The industrial linkage of the tourism characteristic industries is mainly manifested in two ways: The backward linkage, which refers to associating with other industrial sectors through demand relations. The second is a forward linkage, which refers to the correlation with other industrial departments through the supply relationship. When analyzing the tourism characteristic industries with other industries, the industries whose correlation degree is greater than the average level add one standard deviation are the most closely related industries. The industries whose correlation degree is greater than the average level are defined as closely related industries. The industries whose correlation degree is less than the average but not zero are defined as related industries. The industries whose correlation degree is zero are defined as unrelated industries (Song, 2007). Therefore, using this method could analyze the correlation and other effects of tourism characteristic industries.

[28] Direct tourism value added divide the total tourism output

### 4.6.1 Analysis of the backward linkage of tourism characteristic industries

Backward linkage refers to an industry's influence on those industries or sectors that supply products or services to it. From the perspective of input, the production process of the tourism characteristic industries requires various input factors from other industrial sectors. Therefore, the more significant intermediate consumption is, the greater the correlation between tourism characteristic industries and other industries, and the more obvious the impact on the demand of these industries. The correlation effect between tourism and subsequent related industries can be analyzed from two aspects: direct correlation and complete correlation(Shen & Zhang, 2017). Direct correlation refers to the degree of the direct connection between a specific industry and other industries in production and operation, reflecting the pull function and influence of the industry on other industries due to direct consumption. The degree of direct correlation can be measured by the direct consumption coefficient and direct distribution coefficient.

1) Analysis of tourism characteristic industries and its direct backward related industries

The direct consumption coefficient, shown in Table 21, measures the direct consumption relationship of a specific industrial sector to other industrial sectors, also known as the input coefficient, denoted as $a_{ij}$ $(i, j = 1,2, \cdots, n)$, refers to the value of goods or services of the $i$ industrial sector directly consumed by the total output of the j industrial sector in the process of production and operation. The calculation method is as follows: the total input of the product ( or industry) department of j is used to subtract the value of goods or services of the product (or industry) department of $i$ directly consumed in the production and operation of the product (or industry) department$X_{ij}$, which is expressed as:

$$a_{ij} = \frac{x_{ij}}{X_j}(i, j = 1,2,\cdots,n) \quad (11)$$

$a_{ij}$ represents that for each unit of quantity produced by the $j$ department, the greater the direct consumption coefficient of tourism characteristic industries indicates that the tourism characteristic industries have more direct demands on other industries and the more obvious the direct correlation effect is.

**Table 21. The direct consumption coefficient of tourism characteristic industries in 2012 and 2017**

| Department | 2012 | Degree of Relevance | Department | 2017 | Degree of Relevance |
|---|---|---|---|---|---|
| Transportation, warehousing and postal services | 0.386346 | 1 | Transportation, warehousing and postal services | 0.334365 | 1 |
| Rental and commercial services | 0.132798 | 1 | Wholesale and Retail | 0.240305 | 1 |
| Wholesale and Retail | 0.095899 | 1 | Rental and commercial services | 0.125042 | 1 |
| Accommodation and Meals | 0.065566 | 2 | Tourism characteristic industies | 0.060085 | 2 |
| Petroleum, coking products and processed nuclear fuel products | 0.055579 | 2 | Accommodation and Meals | 0.054134 | 2 |
| Food and tobacco | 0.027029 | 2 | Traffic and transportation equipment | 0.032900 | 2 |
| Tourism characteristic industies | 0.021020 | 3 | Resident services, repairs and other services | 0.030698 | 2 |
| Traffic and transportation equipment | 0.020104 | 3 | Culture, sports and entertainment | 0.029343 | 2 |
| Paper printing and cultural and educational sports goods | 0.016918 | 3 | Petroleum, coking products and processed nuclear fuel products | 0.022340 | 3 |
| Financial | 0.016473 | 3 | Communication equipment, computers and other electronic equipment | 0.021496 | 3 |
| Culture, sports and entertainment | 0.015411 | 3 | Paper printing and cultural and educational sports goods | 0.019170 | 3 |
| Communication equipment, computers and other electronic equipment | 0.013540 | 3 | Food and tobacco | 0.019126 | 3 |
| Resident services, repairs and other services | 0.012051 | 3 | Financial | 0.018514 | 3 |
| Production and supply of electricity and heat | 0.010255 | 3 | Agricultural, forestry, animal husbandry and fishery products and service | 0.011696 | 3 |
| Real estate | 0.009992 | 3 | Gas production and supply | 0.007214 | 3 |
| Agricultural, forestry, animal husbandry and fishery products and service | 0.008920 | 3 | Water conservancy, environment and public facilities management | 0.007158 | 3 |
| Chemical products | 0.007983 | 3 | Education | 0.005683 | 3 |
| Information transmission, software and information technology services | 0.007170 | 3 | Other manufactured products and Scrap waste | 0.005627 | 3 |
| building | 0.005496 | 3 | Metal products | 0.004055 | 3 |
| Electrical machinery and equipment | 0.005189 | 3 | Chemical products | 0.003559 | 3 |
| Metal products | 0.003909 | 3 | Production and supply of electricity and heat | 0.003367 | 3 |
| Textile, clothing, shoes, hats, leather, down and their products | 0.003646 | 3 | Textile, clothing, shoes, hats, leather, down and their products | 0.003174 | 3 |
| General equipment | 0.003360 | 3 | Wood products and furniture | 0.002951 | 3 |
| Wood products and furniture | 0.003099 | 3 | General equipment | 0.002767 | 3 |
| Non-metallic mineral products | 0.002331 | 3 | Electrical machinery and equipment | 0.002536 | 3 |
| Metal smelting and calendering products | 0.002057 | 3 | technical services | 0.002273 | 3 |
| Gas production and supply | 0.001450 | 3 | Real estate | 0.001871 | 3 |
| Health and social work | 0.001358 | 3 | Instrument and meter | 0.001422 | 3 |
| Other manufactured products | 0.001253 | 3 | Water production and supply | 0.000839 | 3 |
| Special equipment | 0.000933 | 3 | Textile | 0.000699 | 3 |
| Textile | 0.000790 | 3 | Information transmission, software and information technology services | 0.000670 | 3 |
| Scientific research and technical services | 0.000687 | 3 | Building | 0.000504 | 3 |
| Instrument and meter | 0.000683 | 3 | Health and social work | 0.000205 | 3 |
| Public administration, social security and social organization | 0.000472 | 3 | Non-metallic mineral products | 0.000162 | 3 |
| Education | 0.000253 | 3 | Metalwork, machinery and equipment repair services | 0.000143 | 3 |
| Water production and supply | 0.000132 | 3 | Special equipment | 0.000142 | 3 |
| Metalwork, machinery and equipment repair services | 0.000054 | 3 | Metal smelting and calendering products | 0.000051 | 3 |
| Water conservancy, environment and public facilities management | 0.000049 | 3 | Coal mining and selection products | 0.000007 | 3 |
| Coal mining and selection products | 0.000038 | 3 | Non-metallic ore and other mineral mining and dressing products | 0.000003 | 3 |
| Non-metallic ore and other mineral mining and dressing products | 0.000003 | 3 | Public administration, social security and social organization | 0.000002 | 3 |
| Metal mining and dressing products | 0.000001 | 3 | Oil and gas extraction products | 0.000001 | 3 |
| Oil and gas extraction products | 0.000001 | 3 | Metal mining and dressing products | 0.000001 | 3 |
| Scrap waste | 0.000000 | 4 | Scientific research | 0.000000 | 4 |
| Average | 0.022333 | | Average | 0.025030 | |
| Standard deviation | 0.061994 | | Standard deviation | 0.062894 | |

Note: The degree of relevance：'1' represents most closely related industries; '2'represents closely related industries; '3' represents less related industries; '4' represents unrelated industries.

It can be seen from the direct consumption coefficient in Table 21 that the industry with a higher direct consumption coefficient of tourism characteristic industries in 2012 is Transportation, Warehouse and postal services, Rental and commercial services, Wholesale and Retail. It shows that for every 10,000 Yuan of tourism characteristic products produced by tourism characteristic industries, it shall directly invest in 3,863.46 Yuan of Transportation, Warehouse and postal services, 1,327.98 Yuan of Rental and commercial services, and 958.99 Yuan of the wholesale and retail industry. In 2017, the direct consumption coefficient to Transportation, Warehouse, and postal services declined but remained the highest. The wholesale and retail industry ranked second, rising to 0.240305 compared with 2012.

The direct consumption coefficient of tourism characteristic industries to various industries reflects the degree of its dependence on various industries and reflects the driving ability to various industries. In addition, the direct consumption coefficient of Shandong's tourism characteristic industries on Transportation，warehouse and postal services, Rental and commercial services, the wholesale and retail industry, Accommodation and meals is relatively large, indicating that Shandong's tourism characteristic industries depend on them to a large extent, and at the same time, have a relatively sizeable driving effect on them. Furthermore, Song (2007) took advantage of the China I-O table 2002 to get a similar result. Therefore, it increases the reliability of this thesis. Additionally, during the holidays, hotel prices rise, and it is not easy to buy train and air tickets, also reflecting the substantial driving effect of tourism on the transportation, accommodation, and meals industries.

Xiao (2007) pointed out that in the structure of tourism consumption, the consumption for Accommodation, catering, transportation, and sightseeing is called basic tourism consumption. Moreover, the consumption for shopping and entertainment is called non-

basic tourism consumption. Generally, basic tourism consumption is rigid and will not fluctuate considerably. On the other hand, non-basic tourism consumption is more flexible. Tourists often have an impulse purchase effect, so it is an important symbol to measure the developed level of tourism in a country. In countries with developed tourism industries, the basic tourism consumption is between 30% and 40%, while the large share should be non-basic tourism consumption such as shopping. It is worth noting that, compared with 2012, the direct consumption coefficient of tourism to such industries as wholesale and retail, Culture, sports, and entertainment increased in 2017, which also indicated that non-basic tourism consumption in Shandong Province increased. It also reflects the per capita tourism expenditure in Shandong Province increased. One of the important reasons is the increase in per capita income.

### 2) Analysis of tourism characteristic industries and their complete backward related industries

The complete consumption coefficient is another basic coefficient of input-output analysis. It is an index to analyze the direct and indirect relations between industries from the perspective of input. The sum of direct consumption and all indirect consumption in the production process of an industry or sector constitutes the total consumption of the industry. The economic meaning of the complete consumption coefficient is that the value of an industry's final product or service consumes the products or services of another industry. It is usually calculated as $b_{ij}$ which refers to the sum of the direct and indirect consumption of the products or services of the $i$ industry for each unit provided by the $j$ industry for final use. Take I as the unit matrix, then use direct consumption coefficient matrix A to calculate the complete consumption coefficient matrix B,

$$\boldsymbol{B} = (\boldsymbol{I} - \boldsymbol{A})^{-1} - \boldsymbol{I} \quad (12)$$

Among them, (I-A) is the Leontief inverse matrix. The larger the complete consumption coefficient is, the more significant the complete backward linkage between industries is. The greater the driving effect of the development of one industry on the demand of another industry is. Table 22 is the complete consumption coefficient of Shandong tourism characteristic industries in 2012 and 2017.

Table 22 shows that in 2012 and 2017, among the total consumption coefficients of tourism characteristic industries to other industries, Transportation, warehouse, and postal services all rank first, indicating that its development has a powerful indirect driving effect on tourism development. The direct correlation degree between tourism characteristic industries and many industries is not high, but the indirect effect is significant. Take Petroleum, coking products, and processed nuclear fuel products and coal, for example, 0.215151 and 0.159994 respectively in 2012 and 2017. Although its figure decreased in 2017, it is sufficient to show that although Petroleum, coking products' development has no direct driving effect on tourism development, it has a strong indirect driving effect. Additionally, chemical products have a sizable indirect effect on the tourism characteristic businesses. One significant reason is that both petroleum and chemical products are classified as secondary industries, which play a significant role in the growth of China as a whole, and Shandong has also designated secondary industries as the most important sector. As a result, the secondary industry provides a rather strong indirect benefit to the tourism characteristic industries. Yan and Xiong (2017) analyzed China's tourism condition in 2002 and 2007, and they also indicated that secondary industry ranked the first of the complete consumption.

By comparing the consumption coefficients between 2012 and 2017, it can be seen that the consumption coefficients of Transportation, Warehouse and postal services, Rental and commercial services, Wholesale and Retail, Accommodation and meals, and Financial industries have increased to a large extent in both direct and complete consumption coefficients. It indicates that the development of tourism characteristic industries is driving more and more these industries or sectors.

**Table 22. The complete consumption coefficient of Shandong tourism characteristic industries in 2012 and 2017**

| Department | 2012 | Degree of Relevance | Department | 2017 | Degree of Relevance |
|---|---|---|---|---|---|
| Transportation, warehousing and postal services | 0.495082 | 1 | Transportation, warehousing and postal services | 0.680950 | 1 |
| Petroleum, coking products and processed nuclear fuel products | 0.215152 | 1 | Wholesale and Retail | 0.381896 | 1 |
| Chemical products | 0.182100 | 1 | Tourism characteristic industies | 0.254172 | 1 |
| Rental and commercial services | 0.174455 | 1 | Rental and commercial services | 0.229313 | 1 |
| Metal smelting and calendering products | 0.145415 | 2 | Traffic and transportation equipment | 0.194569 | 2 |
| Wholesale and Retail | 0.139889 | 2 | Chemical products | 0.173953 | 2 |
| Tourism characteristic industies | 0.135516 | 2 | Petroleum, coking products and processed nuclear fuel products | 0.159994 | 2 |
| Oil and gas extraction products | 0.133713 | 2 | Food and tobacco | 0.123236 | 2 |
| Traffic and transportation equipment | 0.114989 | 2 | Communication equipment, computers and other electronic equipment | 0.118475 | 2 |
| Accommodation and Meals | 0.095004 | 2 | Paper printing and cultural and educational sports goods | 0.105021 | 2 |
| Production and supply of electricity and heat | 0.091585 | 2 | Accommodation and Meals | 0.102141 | 2 |
| Food and tobacco | 0.089184 | 2 | financial | 0.097518 | 2 |
| Communication equipment, computers and other electronic equipment | 0.088227 | 2 | Agricultural, forestry, animal husbandry and fishery products and service | 0.079711 | 2 |
| Agricultural, forestry, animal husbandry and fishery products and service | 0.082565 | 3 | Metal smelting and calendering products | 0.064139 | 3 |
| Paper printing and cultural and educational sports goods | 0.077471 | 3 | Resident services, repairs and other services | 0.055933 | 3 |
| financial | 0.061612 | 3 | Culture, sports and entertainment | 0.044211 | 3 |
| General equipment | 0.054760 | 3 | Electrical machinery and equipment | 0.042133 | 3 |
| Metal products | 0.052884 | 3 | Textile | 0.040311 | 3 |
| Coal mining and selection products | 0.051056 | 3 | General equipment | 0.040070 | 3 |
| Electrical machinery and equipment | 0.050621 | 3 | Metal products | 0.036641 | 3 |
| Non-metallic mineral products | 0.040210 | 3 | Oil and gas extraction products | 0.032916 | 3 |
| Textile | 0.030439 | 3 | Production and supply of electricity and heat | 0.030440 | 3 |
| Metal mining and dressing products | 0.028929 | 3 | Gas production and supply | 0.030183 | 3 |
| Real estate | 0.023360 | 3 | Wood products and furniture | 0.028194 | 3 |
| Special equipment | 0.023031 | 3 | Special equipment | 0.019161 | 3 |
| Resident services, repairs and other services | 0.021711 | 3 | Water conservancy, environment and public facilities management | 0.019093 | 3 |
| Culture, sports and entertainment | 0.018270 | 3 | Textile, clothing, shoes, hats, leather, down and their products | 0.018870 | 3 |
| building | 0.018200 | 3 | Other manufactured products and Scrap waste | 0.018532 | 3 |
| Textile, clothing, shoes, hats, leather, down and their products | 0.017317 | 3 | education | 0.017940 | 3 |
| Information transmission, software and information technology services | 0.014566 | 3 | Coal mining and selection products | 0.017314 | 3 |
| Wood products and furniture | 0.013389 | 3 | Non-metallic mineral products | 0.015563 | 3 |
| Instrument and meter | 0.009186 | 3 | Metal mining and dressing products | 0.014783 | 3 |
| Other manufactured products | 0.005188 | 3 | technical services | 0.009439 | 3 |
| Non-metallic ore and other mineral mining and dressing products | 0.004183 | 3 | Instrument and meter | 0.007624 | 3 |
| Scrap waste | 0.003986 | 3 | Real estate | 0.004732 | 3 |
| Metalwork, machinery and equipment repair services | 0.003578 | 3 | Water production and supply | 0.004630 | 3 |
| Scientific research and technical services | 0.003138 | 3 | Information transmission, software and information technology services | 0.003153 | 3 |
| Gas production and supply | 0.002894 | 3 | Non-metallic ore and other mineral mining and dressing products | 0.001621 | 3 |
| Health and social work | 0.002430 | 3 | building | 0.001608 | 3 |
| Public administration, social security and social organization | 0.001380 | 3 | Metalwork, machinery and equipment repair services | 0.001253 | 3 |
| education | 0.000860 | 3 | Health and social work | 0.000445 | 3 |
| Water production and supply | 0.000631 | 3 | Public administration, social security and social organization | 0.000006 | 3 |
| Water conservancy, environment and public facilities management | 0.000410 | 3 | Scientific research | 0.000000 | 4 |
| **Average** | 0.065548 | | **Average** | 0.077253 | |
| **Standard deviation** | 0.0872873 | | **Standard deviation** | 0.1231699 | |

Note: The degree of relevance: '1' represents most closely related industries; '2'represents closely related industries; '3' represents less related industries; '4' represents unrelated industries.

### 4.6.2 Analysis of the forward linkage of tourism characteristic industries

Forward linkage refers to an industry's influence on those industries that use its products or services as inputs or materials. From the perspective of supply, tourism, as an element, is provided to other industries. Other industries directly or indirectly consuming the products or services provided by tourism in the production process. Therefore, to analyze the input-output relationship between tourism characteristic industries and other industries, each industry's share of tourism products or services input directly reflects tourism and its forward related industries. The larger the input share is, the more significant the driving effect and supply influence of tourism characteristic industries on other industries, and the closer the interdependent relationship between industries(Song, 2007).

#### 1) Analysis of tourism characteristic industries and its direct forward related industries

The direct relation of Tourism characteristic industries and its forward linage industries is expressed by direct distribution coefficient, which from the perspective of output. Through the direct distribution coefficient, the flow direction and proportion of tourism products can be known, understand the influence and restriction degree of the development of tourism industry by other industries, which is conducive to the adjustment and formulation of tourism development planning. The larger the direct distribution coefficient of tourism is, the greater the direct demand of other industries for tourism is, and the more significant the direct supply driving effect of tourism is. The calculation formula is as follows:

$$h_{ij} = \frac{x_{ij}}{X_i} (i, j = 1,2, \cdots, n) \quad (13)$$

$h_{ij}$ represents the direct distribution coefficient; $x_{ij}$ represents the usage provided by department $i$ to department j; $X_i$ is the total supply of department $i$.

As shown in Table 23, among the 43 departments, in 2012, the direct distribution coefficient is most closely related to the tourism characteristic industries, including Food and tobacco, Transportation, warehousing and postal services, Chemical products, Rental and commercial services, Accommodation and Meals, Wholesale and Retail, these are the primary direct supply object of tourism characteristic industries, followed by Non-metallic mineral products And Public administration, social security and social organization. In 2017, the direct distribution coefficient was most closely related to the tourism characteristic industries, including Transportation, warehousing and postal services, Wholesale and Retail, Rental and commercial services, Chemical product, followed by Accommodation and Meals. It shows that the development of tourism characteristic industries will directly promote the prosperity of these industries in the first place and effectively directly promote their development. The development of these industries requires the products and services of tourism as inputs, and tourism promotes these industries.

**Table 23. The direct distribution coefficient of Shandong tourism characteristic industries in 2012 and 2017**

| Department | 2012 | Degree of Relevance | Department | 2017 | Degree of Relevance |
|---|---|---|---|---|---|
| Food and tobacco | 0.125213 | 1 | Transportation, warehousing and postal services | 0.213020 | 1 |
| Transportation, warehousing and postal services | 0.121497 | 1 | Wholesale and Retail | 0.089766 | 1 |
| Chemical products | 0.077375 | 1 | Rental and commercial services | 0.084590 | 1 |
| Rental and commercial services | 0.072667 | 1 | Chemical products | 0.073691 | 1 |
| Accommodation and Meals | 0.071782 | 1 | Tourism characteristic industies | 0.060085 | 1 |
| Wholesale and Retail | 0.061996 | 1 | Accommodation and Meals | 0.037676 | 2 |
| Non-metallic mineral products | 0.038012 | 2 | Production and supply of electricity and heat | 0.031430 | 3 |
| Public administration, social security and social organization | 0.031848 | 2 | building | 0.029559 | 3 |
| Metal smelting and calendering products | 0.027551 | 3 | Non-metallic mineral products | 0.028198 | 3 |
| Electrical machinery and equipment | 0.023353 | 3 | Metal smelting and calendering products | 0.028163 | 3 |
| Textile | 0.022018 | 3 | Agricultural, forestry, animal husbandry and fishery products and service | 0.027755 | 3 |
| General equipment | 0.021731 | 3 | Culture, sports and entertainment | 0.025747 | 3 |
| Tourism characteristic industies | 0.021020 | 3 | General equipment | 0.023572 | 3 |
| Real estate | 0.017255 | 3 | Public administration, social security and social organization | 0.021378 | 3 |
| Culture, sports and entertainment | 0.016340 | 3 | Food and tobacco | 0.020725 | 3 |
| Agricultural, forestry, animal husbandry and fishery products and service | 0.015966 | 3 | Real estate | 0.020247 | 3 |
| Petroleum, coking products and processed nuclear fuel products | 0.015384 | 3 | Resident services, repairs and other services | 0.019894 | 3 |
| Paper printing and cultural and educational sports goods | 0.014964 | 3 | Petroleum, coking products and processed nuclear fuel products | 0.019511 | 3 |
| Resident services, repairs and other services | 0.014901 | 3 | Traffic and transportation equipment | 0.017711 | 3 |
| Metal products | 0.014809 | 3 | Communication equipment, computers and other electronic equipment | 0.015491 | 3 |
| financial | 0.013927 | 3 | financial | 0.013695 | 3 |
| Communication equipment, computers and other electronic equipment | 0.012277 | 3 | Metal products | 0.013690 | 3 |
| Traffic and transportation equipment | 0.011755 | 3 | Wood products and furniture | 0.013310 | 3 |
| Special equipment | 0.011420 | 3 | Paper printing and cultural and educational sports goods | 0.012842 | 3 |
| building | 0.010696 | 3 | Coal mining and selection products | 0.011197 | 3 |
| Scientific research and technical services | 0.009738 | 3 | Special equipment | 0.010723 | 3 |
| Oil and gas extraction products | 0.009392 | 3 | Electrical machinery and equipment | 0.010375 | 3 |
| Coal mining and selection products | 0.009291 | 3 | technical services | 0.008415 | 3 |
| Production and supply of electricity and heat | 0.009074 | 3 | Textile | 0.008175 | 3 |
| education | 0.008042 | 3 | Textile, clothing, shoes, hats, leather, down and their products | 0.005537 | 3 |
| Information transmission, software and information technology services | 0.007402 | 3 | Metal mining and dressing products | 0.003706 | 3 |
| Metal mining and dressing products | 0.007047 | 3 | Water production and supply | 0.003577 | 3 |
| Textile, clothing, shoes, hats, leather, down and their products | 0.007036 | 3 | education | 0.002993 | 3 |
| Wood products and furniture | 0.006858 | 3 | Information transmission, software and information technology services | 0.002774 | 3 |
| Health and social work | 0.003242 | 3 | Non-metallic ore and other mineral mining and dressing products | 0.001914 | 3 |
| Non-metallic ore and other mineral mining and dressing products | 0.002354 | 3 | Water conservancy, environment and public facilities management | 0.001712 | 3 |
| Water conservancy, environment and public facilities management | 0.001898 | 3 | Oil and gas extraction products | 0.001673 | 3 |
| Gas production and supply | 0.001059 | 3 | Instrument and meter | 0.001593 | 3 |
| Instrument and meter | 0.000954 | 3 | Other manufactured products and Scrap waste | 0.001291 | 3 |
| Scrap waste | 0.000744 | 3 | Gas production and supply | 0.001154 | 3 |
| Other manufactured products | 0.000544 | 3 | Health and social work | 0.000878 | 3 |
| Water production and supply | 0.000245 | 3 | Scientific research | 0.000490 | 3 |
| Metalwork, machinery and equipment repair services | 0.000118 | 3 | Metalwork, machinery and equipment repair services | 0.000293 | 3 |
| **Average** | 0.022577 | | **Average** | 0.023726 | |
| **Stand devitation** | 0.02934871 | | **Stand devitation** | 0.0361532 | |

Note: The degree of relevance: '1' represents most closely related industries; '2'represents closely related industries; '3' represents less related industries; '4' represents unrelated industries.

2) Tourism and its direct forward related industry analysis

The complete distribution coefficient is an index that analyzes the direct and inter-connection between industries from the perspective of output, and it reflects the total contribution of the industry or department to other sectors. The complete distribution coefficient (expressed by $w_{ij}$) is the direct distribution and the total indirect distribution of the total output of department $i$ to department $j$. It reflects the total contribution of department $i$ to department $j$ directly and indirectly through other departments. It is equal to the sum of the direct distribution coefficients of department $i$ to department $j$ and all the indirect distribution coefficients. H is the direct distribution coefficient matrix.

The formula for calculating the complete distribution coefficient matrix W is expressed as:

$$W = (I - H)^{-1} - I \quad (14)$$

The larger the complete distribution coefficient of tourism characteristic is, the greater the driving effect of tourism on other industries is, and the greater the degree of complete forward linkage between industries is.

**Table 24. The complete distribution coefficient of Shandong tourism characteristic industries in 2012 and 2017**

| Department | 2012 | Degree of Relevance | Department | 2017 | Degree of Relevance |
|---|---|---|---|---|---|
| Chemical products | 0.459958 | 1 | Tourism characteristic industies | 0.125319 | 1 |
| Food and tobacco | 0.360152 | 1 | Chemical products | 0.117312 | 1 |
| Metal smelting and calendering products | 0.250179 | 1 | Transportation, warehousing and postal services | 0.090706 | 1 |
| Transportation, warehousing and postal services | 0.175823 | 1 | Metal smelting and calendering products | 0.061686 | 1 |
| Non-metallic mineral products | 0.175362 | 1 | Wholesale and Retail | 0.0609 | 1 |
| building | 0.174581 | 1 | Food and tobacco | 0.059358 | 1 |
| Petroleum, coking products and processed nuclear fuel products | 0.147564 | 2 | Petroleum, coking products and processed nuclear fuel products | 0.053614 | 2 |
| Tourism characteristic industies | 0.135516 | 2 | building | 0.045322 | 2 |
| General equipment | 0.134218 | 2 | General equipment | 0.045119 | 2 |
| Electrical machinery and equipment | 0.120856 | 2 | Production and supply of electricity and heat | 0.041953 | 2 |
| Textile | 0.120405 | 2 | Rental and commercial services | 0.040192 | 2 |
| Traffic and transportation equipment | 0.116829 | 2 | Accommodation and Meals | 0.038172 | 2 |
| Wholesale and Retail | 0.11623 | 2 | Communication equipment, computers and other electronic equipment | 0.038134 | 2 |
| Rental and commercial services | 0.100781 | 2 | Agricultural, forestry, animal husbandry and fishery products and services | 0.033852 | 2 |
| Communication equipment, computers and other electronic equipment | 0.09669 | 2 | Textile | 0.03134 | 2 |
| Special equipment | 0.095471 | 2 | Metal products | 0.030925 | 2 |
| Accommodation and Meals | 0.093487 | 2 | Electrical machinery and equipment | 0.027773 | 3 |
| Metal products | 0.090261 | 2 | Paper printing and cultural and educational sports goods | 0.027747 | 3 |
| Paper printing and cultural and educational sports goods | 0.087077 | 2 | Non-metallic mineral products | 0.026319 | 3 |
| Agricultural, forestry, animal husbandry and fishery products and services | 0.078434 | 3 | Culture, sports and entertainment | 0.025392 | 3 |
| Production and supply of electricity and heat | 0.070941 | 3 | Special equipment | 0.02453 | 3 |
| financial | 0.060842 | 3 | Public administration, social security and social organization | 0.023767 | 3 |
| Public administration, social security and social organization | 0.056226 | 3 | Real estate | 0.022721 | 3 |
| Textile, clothing, shoes, hats, leather, down and their products | 0.056224 | 3 | Resident services, repairs and other services | 0.021102 | 3 |
| Wood products and furniture | 0.043788 | 3 | financial | 0.016702 | 3 |
| Coal mining and selection products | 0.039192 | 3 | Wood products and furniture | 0.015611 | 3 |
| Real estate | 0.032452 | 3 | Textile, clothing, shoes, hats, leather, down and their products | 0.015342 | 3 |
| Resident services, repairs and other services | 0.025088 | 3 | Traffic and transportation equipment | 0.012838 | 3 |
| Oil and gas extraction products | 0.023708 | 3 | Health and social work | 0.009669 | 3 |
| Metal mining and dressing products | 0.023042 | 3 | technical services | 0.008933 | 3 |
| Culture, sports and entertainment | 0.02001 | 3 | Metal mining and dressing products | 0.007216 | 3 |
| Scientific research and technical services | 0.019171 | 3 | Information transmission, software and information technology services | 0.005715 | 3 |
| Information transmission, software and information technology services | 0.018712 | 3 | Instrument and meter | 0.004948 | 3 |
| education | 0.016901 | 3 | Coal mining and selection products | 0.004765 | 3 |
| Health and social work | 0.016402 | 3 | Water production and supply | 0.004216 | 3 |
| Non-metallic ore and other mineral mining and dressing products | 0.010917 | 3 | education | 0.003781 | 3 |
| Instrument and meter | 0.008937 | 3 | Non-metallic ore and other mineral mining and dressing products | 0.003196 | 3 |
| Other manufactured products | 0.006668 | 3 | Gas production and supply | 0.002153 | 3 |
| Water conservancy, environment and public facilities management | 0.005361 | 3 | Oil and gas extraction products | 0.001996 | 3 |
| Gas production and supply | 0.003742 | 3 | Other manufactured products and Scrap waste | 0.001149 | 3 |
| Scrap waste | 0.002041 | 3 | Metalwork, machinery and equipment repair services | 0.000577 | 3 |
| Water production and supply | 0.001259 | 3 | Scientific research | 0.000419 | 3 |
| Metalwork, machinery and equipment repair services | 0.001078 | 3 | Water conservancy, environment and public facilities management | 0.000301 | 3 |
| **Average** | 0.085874 | | **Average** | 0.02866939 | |
| **Standard deviation** | 0.093488 | | **Standard deviation** | 0.02893942 | |

Note: The degree of relevance：'1' represents most closely related industries; '2'represents closely related industries; '3' represents less related industries; '4' represents unrelated industries.

As shown in Table 23 and Table 24, among the 43 industrial sectors, the major industrial sectors with a close forward and complete correlation with tourism in 2012 and 2017 are mostly secondary industry and territory industries.

It shows that tourism has a significant impact on the secondary and tertiary industries. Most tourism products and services are mainly provided to the secondary and tertiary industries as intermediate products, and it has a positive significance for the development of the secondary and tertiary industries.

In general, compared with 2012, the direct distribution coefficient changed little in 2017, and the complete distribution coefficient decreased, indicating that the supporting role of tourism in the development of other industries is not apparent. The characteristics of tourism itself determine the reason. Tourism products are mainly used for direct consumption rather than as intermediate input. In conclusion, the backward linkage of tourism is more significant than the forward linkage, indicating that the driving power of tourism development to other industries is greater than the supporting role of tourism development in developing other industries.

### 4.6.3 The influence and sensitivity coefficient of tourism characteristic industries

1) The influence coefficient

The influence coefficient reflects the change of the final product of industry to influence the change of the total output of the entire national economy and is shown as the ability of the industry to promote the development of the national economy. The influence coefficient is the ratio of the industry's influence to the average level of the influence of various industries in the national economy. The influence coefficient is greater than or less than 1, indicating that the influence of this industry is above or below the average level of all

industries. The higher the influence coefficient of an industry is, the greater the driving force of the industry to develop the national economy(Xing, Fu, & Zhang, 2017). The calculation formula of the influence coefficient is as follows:

$$\delta_j = \frac{\sum_{i=1}^{n} A_{ij}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} A_{ij}} (j = 1,2,\cdots,n) \quad (15)$$

Where$\delta_j$ is the influence coefficient of department $j$, $A_{ij}$ is the coefficient of the $i$ row and $j$ column in$(I-A)^{-1}$, $\sum_{i=1}^{n} A_{ij}$is the influence level of department $j$.

**Table 25. Influence coefficient of Shandong tourism characteristic industries in 2012 and 2017**

| Department | 2012 | Department | 2017 |
|---|---|---|---|
| Communication equipment, computers and other electronic equipment | 1.457 | Textile | 1.440 |
| Metal smelting and calendering products | 1.352 | Textile, clothing, shoes, hats, leather, down and their products | 1.399 |
| Traffic and transportation equipment | 1.343 | Instrument and meter | 1.395 |
| Electrical machinery and equipment | 1.325 | Communication equipment, computers and other electronic equipment | 1.393 |
| Chemical products | 1.279 | Special equipment | 1.353 |
| Textile, clothing, shoes, hats, leather, down and their products | 1.242 | Wood products and furniture | 1.337 |
| General equipment | 1.222 | Paper printing and cultural and educational sports goods | 1.329 |
| Metal products | 1.217 | Electrical machinery and equipment | 1.309 |
| Petroleum, coking products and processed nuclear fuel products | 1.213 | Metal products | 1.308 |
| Special equipment | 1.204 | Non-metallic ore and other mineral mining and dressing products | 1.259 |
| Paper printing and cultural and educational sports goods | 1.203 | Metal smelting and calendering products | 1.255 |
| Instrument and meter | 1.196 | Traffic and transportation equipment | 1.254 |
| Non-metallic mineral products | 1.180 | Chemical products | 1.235 |
| Non-metallic ore and other mineral mining and dressing products | 1.167 | General equipment | 1.225 |
| Other manufactured products | 1.146 | Non-metallic mineral products | 1.161 |
| Textile | 1.142 | Petroleum, coking products and processed nuclear fuel products | 1.160 |
| Wood products and furniture | 1.126 | Tourism characteristic industies | 1.157 |
| Scrap waste | 1.124 | building | 1.118 |
| Metal mining and dressing products | 1.117 | Metal mining and dressing products | 1.095 |
| building | 1.114 | Metalwork, machinery and equipment repair services | 1.076 |
| Tourism characteristic industies | 1.095 | Health and social work | 1.074 |
| Water production and supply | 1.079 | Food and tobacco | 1.063 |
| Metalwork, machinery and equipment repair services | 1.056 | Coal mining and selection products | 0.983 |
| Food and tobacco | 1.036 | Production and supply of electricity and heat | 0.957 |
| Coal mining and selection products | 1.002 | Resident services, repairs and other services | 0.886 |
| Production and supply of electricity and heat | 0.991 | Gas production and supply | 0.885 |
| Gas production and supply | 0.981 | Transportation, warehousing and postal services | 0.861 |
| Oil and gas extraction products | 0.901 | Information transmission, software and information technology services | 0.854 |
| Rental and commercial services | 0.845 | Oil and gas extraction products | 0.844 |
| Health and social work | 0.831 | technical services | 0.844 |
| Scientific research and technical services | 0.825 | Rental and commercial services | 0.840 |
| Transportation, warehousing and postal services | 0.795 | Accommodation and Meals | 0.774 |
| Water conservancy, environment and public facilities management | 0.764 | Culture, sports and entertainment | 0.772 |
| Information transmission, software and information technology services | 0.758 | Scientific research | 0.757 |
| Accommodation and Meals | 0.742 | Agricultural, forestry, animal husbandry and fishery products and service | 0.668 |
| Resident services, repairs and other services | 0.730 | Other manufactured products and Scrap waste | 0.666 |
| Financial | 0.710 | Water production and supply | 0.654 |
| Culture, sports and entertainment | 0.704 | Financial | 0.645 |
| Agricultural, forestry, animal husbandry and fishery products and service | 0.699 | Water conservancy, environment and public facilities management | 0.643 |
| Public administration, social security and social organization | 0.641 | Public administration, social security and social organization | 0.588 |
| Education | 0.542 | Real estate | 0.558 |
| Real estate | 0.459 | Wholesale and Retail | 0.495 |
| Wholesale and Retail | 0.447 | Education | 0.430 |

Table 25 shows the influence coefficient of 43 industries, including tourism characteristic industries. The influence coefficient of tourism characteristics increased to 1.157 in 2017 from 1.114 in 2012, both greater than 1. Therefore, it has a tremendous

promoting effect on the development of the national economy. Furthermore, the comparison of influence coefficients between 2012 and 2017 shows that the influence of tourism characteristic industries has increased, indicating that the driving effect of tourism on the national economy is gradually prominent over time.

2) The sensitivity coefficient of tourism characteristic industries

The sensitivity coefficient is an indicator that reflects the influence of industry on other industries, and it is shown as the supply pulling ability of the industry to the development of the national economy. The sensitivity coefficient is greater than 1, indicating that the induction degree of this industry is higher than the average level of the whole society. On the contrary, it is lower than the average induction level of the whole society. The higher the sensitivity coefficient of industry, the greater the pulling effect of national economic development on the industry.

$$\phi_j = \frac{\sum_{j=1}^{n} A_{ij}}{\frac{1}{n}\sum_{i=1}^{n}\sum_{j=1}^{n} A_{ij}} (i = 1,2,\cdots,n) \quad (16)$$

Table 26 shows that among the 43 departments, including the tourism characteristic industry, scrap waste was the most driven by the national economy in 2012. Compared to 2012, Oil and gas extraction products were the most driven by the national economy because scrap waste was no longer listed as a different industry sector in 2017. In 2012, the sensitivity coefficient of tourism characteristic industries was 1.055, indicating that national economic development had a robust driving effect on the tourism industry. However, by 2017, the sensitivity coefficient of tourism characteristic industries decreased to 0.547, indicating that the driving ability of national economic development on the tourism characteristic industry was weakening.

In conclusion, both the 2012 data and the 2017 data show that the influence coefficient of tourism characteristic industries is greater than the sensitivity coefficient, indicating that the driving effect of tourism on the whole Shandong economy is greater than the driving effect of its economic development. Moreover, it is consistent with the results of most existing kinds of literature.

It should be noted that the decline of the sensitivity coefficient does not mean that tourism does not develop along with the development of the national economy. It only indicates that the position of tourism in the national economy is relatively declining. Yan and Xiong (2017) indicated that the decline in tourism characteristic industries' sensitivity coefficient is complicated. The reason may be that the tourism industry has a long investment cycle. Moreover, it is vulnerable to external shocks and has the characteristics of vulnerability. As a result, although the tourism industry has a strong ability to pull the industry and plays a significant role in promoting the national economy, people still pay insufficient attention to the tourism industry.

## Table 26. Sensitivity coefficient of Shandong tourism characteristic industries in 2012 and 2017

| Department | 2012 | Department | 2017 |
|---|---|---|---|
| Scrap waste | 5.662 | Oil and gas extraction products | 4.808 |
| Oil and gas extraction products | 3.897 | Metal mining and dressing products | 3.132 |
| Metal mining and dressing products | 3.161 | Transportation, warehousing and postal services | 2.616 |
| Metalwork, machinery and equipment repair services | 2.537 | Other manufactured products and Scrap waste | 2.343 |
| Coal mining and selection products | 2.203 | Metalwork, machinery and equipment repair services | 1.515 |
| Production and supply of electricity and heat | 1.564 | Metal smelting and calendering products | 1.495 |
| Non-metallic ore and other mineral mining and dressing products | 1.295 | Textile | 1.466 |
| Metal smelting and calendering products | 1.293 | Petroleum, coking products and processed nuclear fuel products | 1.434 |
| Rental and commercial services | 1.198 | Chemical products | 1.374 |
| Instrument and meter | 1.141 | Coal mining and selection products | 1.346 |
| Transportation, warehousing and postal services | 1.091 | Communication equipment, computers and other electronic equipment | 1.331 |
| Tourism characteristic industies | 1.055 | Production and supply of electricity and heat | 1.309 |
| Communication equipment, computers and other electronic equipment | 1.040 | Agricultural, forestry, animal husbandry and fishery products and service | 1.215 |
| Chemical products | 0.995 | Non-metallic ore and other mineral mining and dressing products | 1.162 |
| Agricultural, forestry, animal husbandry and fishery products and service | 0.993 | Electrical machinery and equipment | 1.147 |
| Petroleum, coking products and processed nuclear fuel products | 0.973 | Paper printing and cultural and educational sports goods | 1.091 |
| Metal products | 0.885 | Metal products | 1.081 |
| Paper printing and cultural and educational sports goods | 0.880 | Wholesale and Retail | 1.072 |
| Non-metallic mineral products | 0.818 | Wood products and furniture | 1.056 |
| financial | 0.794 | Traffic and transportation equipment | 1.016 |
| General equipment | 0.775 | Rental and commercial services | 1.001 |
| Textile | 0.764 | General equipment | 0.994 |
| Water production and supply | 0.732 | Instrument and meter | 0.987 |
| Electrical machinery and equipment | 0.728 | Non-metallic mineral products | 0.959 |
| Other manufactured products | 0.727 | Water conservancy, environment and public facilities management | 0.951 |
| Accommodation and Meals | 0.719 | Special equipment | 0.936 |
| Traffic and transportation equipment | 0.639 | Food and tobacco | 0.909 |
| Special equipment | 0.595 | Textile, clothing, shoes, hats, leather, down and their products | 0.885 |
| Wood products and furniture | 0.563 | Accommodation and Meals | 0.835 |
| Textile, clothing, shoes, hats, leather, down and their products | 0.557 | Water production and supply | 0.821 |
| Culture, sports and entertainment | 0.557 | Resident services, repairs and other services | 0.771 |
| Information transmission, software and information technology services | 0.530 | technical services | 0.710 |
| Scientific research and technical services | 0.514 | financial | 0.701 |
| Wholesale and Retail | 0.500 | Culture, sports and entertainment | 0.660 |
| Food and tobacco | 0.477 | education | 0.555 |
| Resident services, repairs and other services | 0.463 | Tourism characteristic industies | 0.547 |
| Real estate | 0.389 | Scientific research | 0.424 |
| Gas production and supply | 0.368 | Information transmission, software and information technology services | 0.372 |
| Water conservancy, environment and public facilities management | 0.288 | building | 0.311 |
| building | 0.287 | Public administration, social security and social organization | 0.310 |
| education | 0.258 | Health and social work | 0.306 |
| Health and social work | 0.252 | Real estate | 0.299 |
| Public administration, social security and social organization | 0.241 | Gas production and supply | 0.019 |

# Chapter 5 The problem and The suggestion to establish the Regional Tourism Satellite Account in China

## 5.1 The problem of establishing the RTSA in China

### 5.1.1 The problem of China's tourism statistics system

Tourism characteristic industries and products are the fundamental concepts relating to tourism supply in the most recent international standards. Demand-side related basic concepts such as the visitor's final consumption in cash and kind. These are also the fundamental concepts of TSA. In China, tourism has never been incorporated into China's national economic accounting system, and the existing tourism statistics system contains only a few basic concepts and related statistical indicators, tourism revenue is the only concept associated with tourism demand. Additionally, tourism supply concepts are nearly non-existent. As discussed in Chapter 2, most indexes are physical indexes and are deficient in terms of value indicators. Therefore, the results do not fully reflect the scope and importance of tourism in the regional economy. Moreover, it cannot meet the requirements for building TSA using value indications. The following is a study of China's tourism statistics system problems that affect both the demand and supply sides of TSA compilation.

From the demand perspective, tourism consumption data are missing. So there is a lack of theoretical and computational basis for the tourism supply ratio. Based on TSA: RFM 2008, the tourism ratio ( in percentage ) estimates the TVA, and according to para 4.50-4.56, the TSA requires a systematic comparison of total domestic supply of tourism products with domestic tourism consumption on a product-by-product basis, with the share of domestic

tourism consumption for each component of supply built up by activities and products. Further, a tourism share needs to be stripped out for the tourism characteristic industries to determine how much of the variable's value can be attributed to domestic tourism consumption. Furthermore, based on the tourism share determined for the output, it is possible to decide on intermediate consumption which belongs to the tourism share. Based on the difference between the value of the production attributable to tourism consumption and intermediate consumption, it is possible to calculate the value-added generated by tourism consumption. The impact of using various assumptions related to the production of tourism goods and services is that the results will be compiled using the model rather than directly observed and reconciled with statistical data. Therefore, it would affect the accuracy of the statistical outcomes. According to the TSA: RFM 2008, the tourism share is the one that represents the share of tourism consumption in the domestic supply of each product. According to the above principles and ideas, this paper defines a tourism stripping coefficient as the proportion of the industry's total supply attributable to tourism consumption, considering both the industry's total output and tourism consumption. This ratio directly impacts the value-added of tourism compared to related industries and tourism employment, thus on the significant tourism economic indicators such as tourism value-added and tourism employment. Due to the lack of regular tourism sampling surveys, Shandong's domestic tourism consumption data was not updated after 2001. The only way to assign the tourism consumption ratio between 2012 and 2017 in this paper is to use the relevant data from SDTSA 2008. It, undoubtedly, also reduces the credibility of the data. According to the TSA: RFM 2008, these tourism shares can be determined in different ways：

1）From direct information coming from producers and suppliers (info on their categories of customers and their corresponding market share);

2）From visitors themselves (sample surveys of expenditure by product and indication of providers);

3）From the opinions of experts in tourism behavior can be validated through best practices (judgmental procedure).

That's why tourism consumption data is crucial to determine the share of tourism and calculate TVA.

From the supply perspective, since TSA requires the reclassification of industries，there is a big gap with the current classification of industries in the SNA. As a result, it is not easy to collect data on the supply side of tourism in TSA. The data of tourism supply-side mainly comes from the input-output table in the national statistical system or the relevant data of industry suppliers in the economic census. Based on the tourism industry classification catalog recommended by the World Tourism Organization. Under the current tourism statistics system in China, as well as *The statistical classification of China tourism industries and related industries 2018*, the tourism supply data are missing as follows: some new tourism industries are not included in the national economic statistics system, such as tourism design companies, professional tourism websites, consulting companies, tourism information centers, etc. are not reflected in the original statistics system.

Moreover, there is no specific statistical survey for the industrial activities that provide part of the output for tourists. Therefore, it is difficult to separate them from the major departments—for example, the basic infrastructure such as museums that serve the residents and tourists, without a specific survey, it is not easy to determine the contribution of tourism. In addition, the proportion of the output of each type of tourism industry is missing, and every kind of tourism industry produces some non-main products in addition to its primary products. For example, the hotel's main business is accommodation. However,

accordingly, it also provides catering services. Still, the output ratio of tourism characteristic products of each type of industry is not investigated, which affects the calculation of the supply tourism ratio of each type of tourism industry.

Australia Bureau of Statistics (ABS) ensures consistency across the national and regional TSA. And TRA is the leading government research organization that conducts a comprehensive and detailed survey of tourism, which could provide the data on regional shares of tourism expenditure (Pham et al., 2008). Therefore, compared with Australia, another problem still exists in China's tourism statistics system: the survey and statistics methods of countries and regions are inconsistent and between regions. Even The National Bureau of Statistics and the National Tourism Administration also do not have a unified standard, which causes the data incredible. Therefore, it is impossible to make RTSA reconcile with the national TSA, and it could not make a comparison between provinces.

### 5.1.2 Data problem

Data has always been a critical difficulty in establishing either national-level TSA or RTSA. In Chapter 3, comparing SDTSA2008 and QDTSA in Australia, it is easy to find that the data sources of SDTSA are relatively complex. This phenomenon illustrates the narrow range of information sources. For example, many tourism service enterprises are not included in the regular statistical survey system, especially private and individual business units engaged in small catering, tourism products, tourism information services, tourism planning and consulting, etc. Much of the information requires the assistance of multiple parties, which undoubtedly adds to the cost and time of preparation. If the data source is too broad, this is no doubt to influence the accuracy of the data.

In Chapter 4, there are cases where the proportion of tourism for air passenger transport is greater than 1. Such cases are all found in the existing RTSAs of China. The reason is that typically, the establishment of TSA is from the national level because a nation's economy is a relatively closed system with a steadier condition, which could be easier to keep a balance between supply and demand perspective. However, this balance does not exist at the regional level. The region is a conversely open environment, and the condition is more complicated than the national condition. It adds difficulty to cross-industry and cross-regional statistical accounting. Some departments' business scope is not under the administrative region division (e.g., railway, banking, communications, etc.). For example, the Suzhou railway station in Jiangsu province subordinates to the Shanghai railway bureau. Its contribution belongs to Shanghai. Such things caused data collection and relative calculation to be more complicated in China. Therefore, it is necessary to consider the method to deal with such kinds of issues.

Further, it is also mentioned in Chapter 4 that the data required in Table 4 of the TSA are compiled based on consumer prices. In contrast, the supply-side data obtained through the input-output tables are calculated in production prices. Therefore, data from both need to be adjusted to improve the credibility of the results when building the RTSA.

As the information described in Chapter 3, SDTSA 2008 does not separately divide tourism consumption and tourism expenditure. Therefore, it would be difficult to sort the expenditure data into the correct category. "Tourism consumption" includes services associated with vacation accommodation on its account, tourism social transfers in kind, and other consumption, which do not belong to the range of the "Tourism expenditure" (TSA: RMF 2008). Furthermore, "Tourism consumption" also makes some other precise

adjustments about "Tourism expenditure" when used in Tables 4 and 6. Therefore, it is not easy to assure data accuracy if we could not differentiate these two conceptions.

### 5.1.3 The problem of the compilation method

Two approaches could be applied for establishing RTSA, and Australia used the hybrid approach. However, SDTSA's compilation process is relatively complex, which is hard to define which method is used. The top-down method requires the proactive central statistical office, regionally stratified national survey, and a full regional Input-output table. Moreover, the bottom-up approach needs the developed regional account, regional tourism consumption data, local institutional engagement, and technical human capital. In preparing Shandong tourism satellite accounts for 2012 and 2017, there is a greater tendency to use the bottom-up method, using Shandong's input-output table with its regional consumption data.

However, China's current situation not satisfied both of these two approaches' requirements. Comparing with Australia, China has a more complex geographic condition and tourism resources allocated differently. Therefore, from a top-down perspective, it is tough to standardize the structure across regions. The essential requirement of the bottom-up approach is to regard the region as a "small nation." China has many administrative regions, the industrial structure is diverse, and the economy is distributed unevenly. Hence, it is tough to deal with the inter-province trade information and establish the RTSA in each province. Furthermore, Australia's RTSA is based on Australia's national TSA. China does not have a mature national TSA; hence, which method of China's RTSA should adopt has to consider carefully.

On the other hand, in the fourth chapter, when establishing tourism characteristic industries, this paper based on TSA: RFM 2008 as well as *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. Although most of the tourism characteristic industries have been included, there are still some shortcomings. For example, in the transportation industry, there is no separate classification for passengers and non-travelers in GB/T 4754-2017, which makes it difficult to extract accurate data. For example, in *The statistical classification of China tourism industries and related industries 2018*, the classification of tourism tours includes eco-tourism tours, agricultural tourism, and leisure tourism, which belong to agriculture in GB /T 4754-2017, and agricultural, forestry, animal husbandry and fishery and services in I-O table. Still, such tourism characteristic industries are ignored in the preparation of SDTSA in 2012 and 2017. So improving and detailing the tourism characteristic industries is also one of the challenges in establishing RTSA in China.

Two approaches could be applied for establishing RTSA, and Australia used the hybrid approach. However, SDTSA's compilation process is relatively complex, which is hard to define which method is used. The top-down method requires the proactive central statistical office, regionally stratified national survey, and a complete set of regional Input-output tables. Moreover, the bottom-up approach needs the developed regional account, regional tourism consumption data, local institutional engagement, and technical human capital. In the calculation of Shandong TVA for 2012 and 2017, there is a greater tendency to use the 'bottom-up method", using Shandong's input-output table and regional tourism consumption data.

However, China's current situation not satisfied both of these two approaches' requirements. Comparing with Australia, China has a more complex geographic condition and tourism resources allocated differently. Therefore, from a top-down perspective, it is tough to standardize the structure across regions. The essential requirement of the bottom-up approach is to regard the region as a "small nation." China has many administrative regions, the industrial structure is diverse, and the economy is distributed unevenly. Hence, it is tough to deal with the inter-province trade information and establish the RTSA in each province. Furthermore, Australia's RTSA is based on Australia's national TSA, while China does not have a mature national TSA; hence, which method of the CRTSA should adopt has to consider carefully.

On the other hand, in the fourth chapter, when establishing tourism characteristic industries, this paper is based on TSA: RFM 2008 as well as 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. Although most of the tourism characteristic industries have been included, there are still some shortcomings. For example, there is no separate classification for passengers and non-travelers in the transportation department(GB/T 4754-2017), making it difficult to extract accurate data. For example, in the statistical classification of China tourism industries and related industries 2018, the classification of tourism tours includes eco-tourism tours, agricultural tourism, and leisure tourism, which are not classified separately in GB /T 4754-2017. They belong to agriculture, forestry, animal husbandry, and fishery products; in input-output, such tourism-related industries are ignored when determining the tourism characteristic industries in SDTSA 2012 and 2017. So improving and detailing the tourism characteristic industries is also one of the challenges in establishing RTSA.

### 5.1.4 The problem of complexity and lag

Even though TSA is the most helpful tool to assess tourism contribution to a destination's economy, its compilation and practical application are limited in many countries or regions. The complexity and lag are the most common problems in TSA. The reasons for this are as follows: Firstly, in some countries or regions, compiling TSA is very time-consuming and expensive, as not all the required data are available or easily accessible. Second, because tourism activities occur in different sectors, the data needed to compile a TSA covers a wide range of areas. Therefore, significant efforts and developed administrative infrastructure are required to capture the necessary data by using surveys (direct) or appropriate modeling approaches (indirect).

Second, the separation of tourism data from national accounts or input-output tables can be complicated due to the lack of disaggregation of tourism-specific products or tourism industries in these accounts/tables. This problem is particularly problematic for RTSA, as many cities do not collate their input-output tables.

Third, TSA is often published on a delayed basis. It limits the use of TSA in practice. In most countries/regions, TSA is not released on time. For these reasons, the compilation of TSA, especially RTSA, has been compiled infrequently or not at all. For those regions where TSA has been compiled, their subsequent use and application have been somewhat limited. For China or a large city, it may be beneficial to create a TSA. In contrast, a TSA may be too complex for a smaller region, and the expense often outweighs the benefit. Whereas I-O tables for a country or region are usually produced only once every few years, there is no doubt that the data lags using past I-O tables. As time changes, the relationship

between industries, production, consumption, etc., will change, affecting the effectiveness of TSA (Q.-H. Zhu, 2009).

## 5.2 The suggestion of constructing RTSA

### 5.2.1 Analysis of countermeasures to improve the statistical indicators of tourism consumption and supply in China

The above analysis reflects that the main difficulties for the compilation of RTSA in China. On the one hand, China's current tourism consumption indicator system is not perfect. On the other hand, the industry classification and statistical scope in China's current national economic accounting system cannot meet the supply data requirements of TSA. Therefore, the improvement of the tourism statistics system must be based on the scientific tourism classification system. This paper proposes modifying tourism consumption and supply statistical indexes to meet the TSA compilation requirements based on improving the tourism statistics system in China.

1）Constructing the tourism statistics index system with tourism value-added and tourism consumption as the core, the core indexes of the current tourism statistics in China are tourists number and tourism revenue. Tourists number is the physical quantity index, and tourism revenue is only equivalent to the cash consumption of tourists. These two indexes only reflect the scale of the tourism market from the perspective of consumption. They cannot reflect tourism's contribution to the regional economy, nor can they be compared between regions. Therefore, we should build a tourism statistics index system with tourism value-added as the core, such as tourism value-added and tourism consumption according to the requirements of TSA's compilation.

(2) Improving the conceptual system of visitor and tourism consumption so that tourism consumption indicators are comprehensive and systematic. Tourism consumption indicators include physical quantity indicators and value quantity indicators. These indicators should be disaggregated by day-trip tourists and tourists with different tourism purposes: such as sightseeing, leisure, and vacation, business, visiting friends and relatives tourists. On the other hand, tourism consumption indicators include domestic tourism consumption, inbound tourism consumption, tourism cash consumption, tourism consumption in kind, tourism actual final consumption, etc. In addition, with the development of tourism, some new tourism consumption concepts and corresponding statistical standards should be added. For instance, the definition of the second or third home included in the scope of accounting for TSA; the compilation of tourism durable goods catalog, the compilation of the catalog of pre-and post-travel consumption, etc.

3）It is necessary to improve the concept system of tourism supply to compile TSA. The conceptual system of tourism supply includes tourism characteristic products and tourism characteristic industries, which reflect the tourism industry's production and scale. This new standard usually according to the classification of the tourism industry and products recommended by the World Tourism Organization.

### 5.2.2 Big data

Kang (2011) indicated that TSA could perfect the tourism statistics system. There are many problems in China's tourism statistics system, and the development of information technology and big data has provided new ideas and means to solve the thorny issues. Therefore, big data to assist in preparing TSA and its inclusion in tourism statistics is an inevitable development trend.

Big Data has multiple V characteristics such as large data volume (Volume), diverse data types (Variety), fast generation speed (Velocity), large data volatility (Volatility), poor data authenticity (Veracity), and low data value density (Value)(S.-W. Li, 2015).

Tourism big data involves 3 data levels: big data, tourism data, and tourism statistics. Tourism big data has some characteristics, including (a) involving many departments, tourism data is vast and complex, and information sharing mechanism is crucial. Tourism big data is cross-industry, cross-sector, and multi-dimensional data, which requires the cooperation of horizontal departments such as statistics, commerce, transportation, customs, public security, etc. It also needs collaboration with operators, online travel service providers (OTA), major search engines, etc., to form a data interchange and sharing mechanism(Wen & Li, 2017).

(b) The proportion of unstructured data is high—the search engine data generated by tourists through Baidu, Google, and other search engines. Geographic location data, evaluation data, and consumption data generated by WeChat, APP, and other software, many of which appear in the form of pictures, audio, and video, and the correlation between the data is not apparent(Liu, 2018). Therefore, applying big tourism data requires non-linear and non-traditional methods to analyze, predict, and finally present to the public in structured data.

(c) High demand for real-time analysis (X.-L. Wang, 2018). Tourism statistics provide data that can respond to market dynamics and industrial scale. However, few and untimely channels for releasing tourism statistics about important standards are criticisms that have not been solved. The rapid development of the tourism industry requires timely and effective statistics as support for tourism decision-making. The construction of a tourism statistics release platform supported by big data technology can help eliminate lagging

tourism data release. It distributes tourism data through online and offline cooperation, helps tourism enterprises and research institutes make better use of statistical data, reduces the cost of data use, and realizes the improvement of high accessibility and timeliness of tourism statistics.

"Big data" provides the basis and technical methods for measurement, and "tourism data" is to bring together various single data, mining to form multiple types of data needed to provide data support for tourism management. The "tourism statistics" is the authoritative data developed and published by the data generation format stipulated by the National Tourism Administration and the National Bureau of Statistics in the form of regulations, which has legal effect. Tourism statistics is the most crucial part of tourism data, is the top level of tourism data. Traditional tourism statistics have numerous drawbacks, resulting in missing many tourism statistics (Xing et al., 2017). For example, the statistical caliber of hotel registration is incomplete, and the accuracy of the tourism consumption survey is not high. With the emergence of various new forms of tourism, traditional statistical methods face more and more challenges. The number of tourists could not be obtained from the demand side in the past, and data could only be found from the supply, i.e., the individual enterprises receiving tourists. Nowadays, there are many technical means for tourists' location information: satellite positioning, base station location, cell phone location, APP, etc. There are also many data sources for tourism revenue, such as short message notifications, credit cards, micro-payment, OTA booking, online payment, APP bookkeeping, travel tips, etc. These data are much more credible than questionnaires due to their objective characteristics—the data needed for TSA. Tourism statistics can be collected through web booking systems, e-ticket systems, portable devices, and tourism consumption systems for tourism-related data. Timeliness and accessibility are the criteria

for measuring the quality of tourism data in tourism statistics. These kinds of technology assist in improving the efficiency of acquiring the data.

Improving tourism statistics and analysis based on tourism big data mainly includes: First, improving the scope of tourism data collection and improving the accuracy of tourism statistics. For example, in tourist concentration areas such as airports, docks, and tourist spots, artificial intelligence face recognition technology could conduct the number of tourists. Second, the use of tourism big data to improve the construction of TSA. By collecting and analyzing mobile phone operators' data, grasping tourists' behavioral preferences and travel trajectories. And at the same time, in cooperation with UnionPay consumption data and third-party payment software consumption data, the per capita consumption of tourism is projected to provide reference data for TSA construction and provide data support to comprehensively and accurately reflect the comprehensive driving effect of the tourism industry on other industries. Third, the integration of data from the supply side of the tourism industry provides a basis for open tourism destination data statistics and facilitates specific statistics. The effective combination of current operators' big data and scenic spots can realize real-time passenger flow monitoring and analysis, insight of tourists' characteristics, and location trajectory analysis in the network coverage area. It makes tourism supply-side statistics no longer limited to direct reporting data such as scenic spot tickets and hotel registration patronage, especially providing a relevant basis for open tourism destination data statistics. Such as through the mobile base stations to obtain information about where are the tourists come from, how long they will stay here. The transportation department's help makes the rural tourism statistics and tourist resort statistics with a more extensive scope and larger population challenging to carry out in the past become possible.

Although big data is gradually playing an important role in tourism statistics, the characteristics of big data itself also have difficulties in tourism statistics. It is mainly reflected in the following aspects.

(a) It still relies on the improvement and development of the basic tourism theory, so it needs to explore the connotation and extension range of the concept of statistical tourism continuously.

(b) The open and sharing mechanism of big data resources is not yet perfect. Tourism big data sources are scattered, data standards and indicators are not uniform in caliber. It is challenging to integrate and connect between data, limiting the application and sharing of big data. Tourism big data needs infrastructure equipment in hardware, data accumulation, integration, and application innovation in software.

(c) The proportion of unstructured data and semi-structured data in tourism big data is much more significant than structured data. And the size of data exceeds the ability of traditional database software tools to capture, store and analyze, making it challenging to use traditional measurement and analysis techniques to solve problems. Therefore, the application of big data in tourism statistics is based on the advancement of big data processing technologies and processing systems and relies on the practice and development of emerging technologies such as cloud computing, real-time data distribution subscription, etc. (X.-L. Wang, 2018).

(d) Big data acquisition involves privacy and confidentiality. Therefore, implementing necessary privacy and confidentiality protection is the primary problem that must be solved in promoting big data application strategy.

### 5.2.3 Web-based TSA information system

As mentioned before, TSA has a lagging nature. So far, all of China's RTSAs are one-time compilations, and none of the Chinese regions compile RTSA regularly. Without a regular compilation of TSAs, it is not easy to dynamically study the characteristics of tourism development at different times or in different areas. Therefore, an innovative web-based TSA information system is presented using Guangdong Province as an example. It integrates all TSA compilation process chain functions, including data entry, data storage and management, a compilation of TSA tables, statistical analysis, and other extended applications (Wu, Liu, Song, Liu, & Fu, 2019). The system improves the efficiency of tourism data management and TSA compilation and enhances and expands the role of TSA in assessing the economic contribution of tourism to destinations. This system is based on web-based information systems. With the development of internet technologies, the development of web-based tourism information systems is also growing rapidly. Of particular note is the Travel Recommendation System (TRS), which aims to provide customized information to match the needs of tourists with the availability of leisure resources and attractions(Ricci, 2002). Some TRSs also take a dynamic approach, combining location and weather information to provide visitors with appropriate and intelligent advice(Lamsfus, Martin, Salvador, Usandizaga, & Alzua-Sorzabal, 2009). The main advice offered by TRS relates to tour packages, attraction suggestions, trip planning, and social interaction(Borras, Moreno, & Valls, 2014). However, the integration of web-based systems in TSA has been limited so far compared to other cases. Wu et al. (2019) indicated that although web-based systems could not solve all problems, they can improve TSA's efficiency and practical application. The system provides a platform for continuous and timely compilation of TSA. Data from

different sources are entered and effectively organized on one platform. TSA tables and statistical analysis are generated automatically. In addition, because the system is network-based, users can access data and information anywhere and anytime, which provides convenience and efficiency for users. This system promotes the technical level of TSA development. At least to a certain extent, it makes up the gap between academic knowledge and practice in tourism economics.

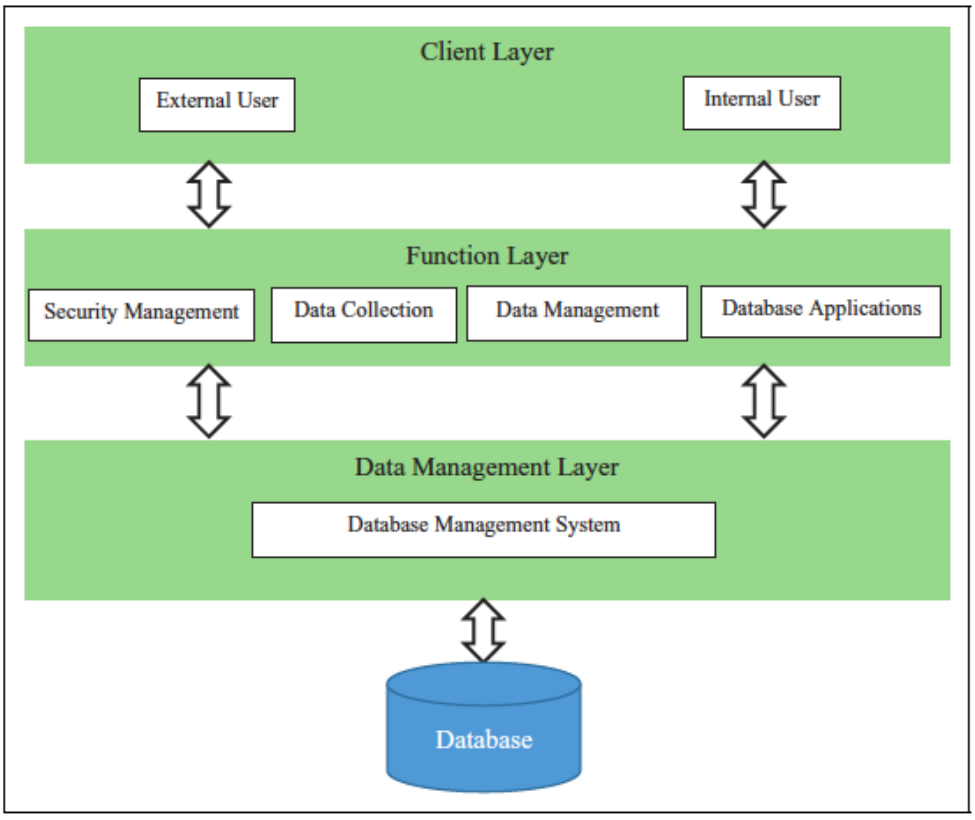


Figure 12. Design architecture of the Web-based TSA information system. Picture edited by Wu et al. (2019)

The first layer is the client layer. Authorized customers can log in to the system through the Internet browser of the local computer. Customers can be divided into external users and internal users. External users are government and industry practitioners authorized

to view the system's output, including TSA results and subsequent applications. Internal users include system administrators and TSA specialists. All accounts/users are registered and managed by the administrator, who also can maintain and update the system. Specialists are responsible for compiling and extending TSA applications.

The functional layer is the core component of the system. It includes programs for clients to communicate with the system, including security management, data collection, data management, and database applications. It is an essential component of the security management system; it assigns different user types with varying permission levels.

Data acquisition, data management, and database application components compile TSA tables and apply TSA results to various extension functions. The third layer of the system is the database management layer, which consists of two databases. The first database for storing data collected from different sources, TSA tables, and extension tables applications. The second database stores the code to compile and execute the TSA tables extended analysis.

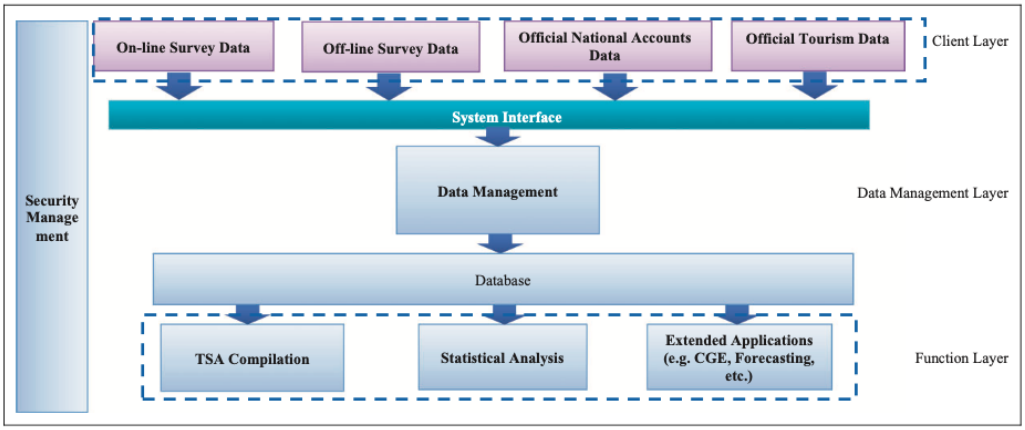


**Figure 2.** Functions of the Web-based TSA information system. TSA: tourism satellite account.

Figure 13. Functions of the Web-based TSA information system. Picture edited by Wu et al. (2019)

Wu et al. (2019) evoked a web-based TSA information system that shares some standard features with other web-based systems, including good accessibility, convenience, and ease of use. It provides an easily accessible web-based TSA information system to enhance the practical use of TSA by relevant government, industry, and third sector stakeholders. This system is an effective way to bridge the gap between the academic development of TSA methods and their empirical application in different case study areas. Secondly, different functionalities are designed and integrated into the platform to cover the whole TSA preparation process chain: data collection, data management, TSA preparation, statistical analysis, and other extended applications. Consistent rules are configured to generate and apply TSA results, facilitating rigorous and robust comparisons of tourism development over time and space. Third, the proposed innovative system improves the efficiency of TSA compilation and provides researchers with new concerns and perspectives for future research and applications in this field. Fourth, based on this system, TSAs can be compiled regularly.

# Chapter 6 Conclusion

Regional tourism satellite accounts (RTSAs) are critical for a holistic assessment of tourism's status and contribution to the regional economy. Although several developed countries have reached milestones with their national tourism satellite accounts (TSA), RTSA has always been a source of contention for researchers. Therefore, creating a localized RTSA in China is an exciting exploration that adds to the experience of developing RTSA globally.

The main work accomplished in this thesis includes:

1. To establish the groundwork for this study, it will begin by reviewing and summarizing SNA, China's System of National Accounts (2002), the relationship between SNA and satellite accounts, as well as Tourism Statistics and China's Tourism Statistics system. Second, the thesis grasps the requirements, principles, and tables for compiling TSA by introducing the fundamental theory of TSA and the experience of three countries, Canada, New Zealand, and Japan.

2. The RTSA theoretical system is examined. To begin, the paper discusses the global development of RTSA. Following that, a complete overview of the accomplishments of two nations, Denmark and Australia, will be provided in the development of RTSA. Additionally, a thorough examination of the development of existing RTSA in China demonstrating the development status of RTSA more clearly and comprehensively.

3. The practical exploration of creating a Shandong TSA, based on the fundamental theory of TSA and the input-output table of Shandong province in 2012 and 2017, simplifies the compilation method of RTSA and creates a new input-output table that includes tourism

characteristic industries, which is a novel attempt. It depicts the indirect tourism impact, indicating the economic contribution of Shandong tourism more comprehensively.

4. The new I-O table has been used to analyze the backward and forward linkages, influence coefficients, and sensitivity coefficients of Shandong's tourism characteristic industries. As a result, the interaction between tourism characteristic industries and other sectors is examined.

Chapter 4 and 5 are critical components of this thesis. Chapter 4 presents the following findings after measuring and analyzing the contribution of Shandong tourism in 2012 and 2017 divided into two parts

(1) About direct and indirect tourism value-added

a) The direct tourism value added is 2182.61 million Yuan in 2012. According to Shandong's 2013 yearbook, the province's total GDP was 50013.24 million Yuan in 2012. As a result, direct tourism value contributed represents 4.36 percent of overall GDP. Additionally, direct tourism value added is 3658.00 million Yuan in 2017, or 5.03 percent of total GDP.

b) Finally, it was determined that tourism's indirect value contributed was 1588.932 billion yuan in 2012, accounting for 3.18 percent of total GDP. Additionally, it was 2236,012 billion yuan in 2017, accounting for 3.08 percent of total GDP.

(2) Analysis results and suggestions from various coefficient analyze

a) By examining the correlations and other effects of Shandong's tourism characteristic industries. To begin, it demonstrates that transportation, warehouse and postal services, rental and commercial services, wholesale and retail services have consistently had the highest direct consumption coefficients of tourism characteristic industries between 2012 and 2017, indicating that Shandong's tourism characteristic industries rely heavily on them while also having a sizable driving effect. According to TSA's method, transportation

services are divided into four specific catalogs—Railway, Road, Water, and Air passenger transport. Because Shandong has the developed high-way road system, road passenger transport always occupies the highest proportion. However, air passenger transport and water passenger transport relatively weak. Shandong's international airports are limited to air passenger transport and have an illogical airline structure, while many international routes are insecure. Although the four international airports of Qingdao, Yantai, Jinan, and Weihai have increased flight density from Japan, Korea, Hong Kong, and Taiwan and other key passenger source countries and regions, there are very few long-haul international flights to Europe and the United States. It limits the development of inbound and outbound tourism. Shandong Province is located close to Japan, South Korea, and several popular tourist destinations in China in terms of maritime traffic. As a result, Shandong Province's maritime tourism transportation infrastructure has not been established, and it is a pity that it has not made full use of its advantages. Because Transportation, warehouse, and postal services significantly impact tourism, the government and related organizations may actively encourage the opening of long-distance routes, which will significantly boost inbound and outbound tourism in Shandong Province. Not only may this increase Shandong Province's international awareness and facilitate the development of inbound tourism, but domestic tourists can also opt to depart or transfer services in Shandong, thereby expanding the potential for tourism development in Shandong. Second, according to an interview with Mr.Zhang and the latest news published by Shandong Provincial Department of Culture and Tourism, the development of marine tourism in Shandong province will be the next priority, with improvements to the water system, the construction of cruise ships, and yacht docks, the opening of lines, the development of holiday leisure

islands, and an increase in knowledge about marine tourism products providing additional assistance.

Additionally, there is one point to consider: between 2012 and 2017, wholesale and retail climbed from 0.095899 to 0.240305. In 2017, there was also an upsurge in culture, sports, and entertainment. These departments are referred to as non-basic tourism consumption, and it is a critical indicator of a country's developed level of tourism. As per capita tourism expenditure climbed in Shandong Province, this type of indicator increased as well. A significant factor for this is the increase in per capita income , people would like to spend the money to improve life's quality. Another reason is that it is connected to the planning of the government. Following the 12th Five-Year Plan, Shandong Provincial Government has developed various forms of cultural experience tourism to enrich people's cultural lives. By utilizing the Confucius cultural tourism festival, the Nishan World Famous Forum, and other cultural festival activities, we can promote the Confucian culture's resource advantage to develop Confucian culture as the core of traditional studies in tourism. It posited and developed the market in China, Japan, and South Korea to establish Shandong as a destination for research tourism. Therefore, Jining will establish a demonstration base for research tourism. Develop characteristic cultural tourism products, including spring and autumn cultural tourism, celebrity cultural tourism, ancient city and historical district tourism, industrial cultural tourism, religious cultural tourism, folk culture tourism, military culture tourism, etc. As a result, the results demonstrate that the government's policy is effective.

b) While the complete consumption coefficient of petroleum, coking products, processed nuclear fuel products, coal, and chemical products declined in 2017, they all still

significantly indirectly affected the tourism characteristic industries. One crucial reason is that both petroleum and chemical products are regarded as secondary industries, contributing significantly to China's overall growth. Shandong has designated secondary industries as the province's most important sector. As a result, the secondary industry indirectly benefits the tourism characteristic industries quite a bit.

c) By comparing consumption coefficients between 2012 and 2017, it is clear that both direct and complete consumption coefficients for Transportation, Warehouse and postal services, Rental and commercial services, Wholesale and Retail, Accommodation and meals, and Financial industries have increased significantly. This suggests that the growth of tourism characteristic industries is driving the development of these industries or sectors. Compared with some studies in other provinces, the proportion of accommodation and meals is not very high, especially the accommodation. The reasons for this phenomenon may include the following: 1. In recent years, Shandong has vigorously developed rural tourism, and most of the rural tourism accommodation forms are B&B, which has not been formally included in the tourism statistics system. 2. The level of tourist accommodation facilities in Shandong Province is not high, and there are few high-end hotels even in big cities, so the cost in this aspect is lower than that in other places. Therefore, it is essential to improve the statistics of non-traditional accommodation. At the same time, the establishment of more high-end hotels attracts more high-consumption groups, enhances the level of consumption.

d) In general, the direct distribution coefficient changed little in 2017 compared to 2012, but the complete distribution coefficient fell, indicating that tourism does not appear to play a supportive role in the development of other industries. The nature of tourism determines the reasons for this. Tourism products are primarily consumed directly instead of being employed as intermediate inputs. In conclusion, tourism's backward linkage is more

significant than its forward linkage, showing that tourism's pushing force for other industries is greater than tourism's supporting role in other industries' development.

e) The tourism characteristics industries' influence coefficient increased to 1.157 in 2017 from 1.114 in 2012, both larger than one. As a result, it has a very beneficial effect on the growth of the national economy. Additionally, the sensitivity coefficients decreased lower than one in 2017, indicating that the driving ability of national economic development on the tourism characteristic industry was weakening. The 2012 and 2017 statistics suggest that the influence coefficient of tourist characteristic industries is bigger than the sensitivity coefficient, showing that tourism has a greater driving effect on the Shandong economy than economic development.

The above results have similar results with other research papers, which increased the reliability of this paper.

Chapter 5 summarizes the findings concerning the issues and recommendations for establishing RTSA in China. The first issue is about China's tourism statistics system. From a demand standpoint, it is primarily due to a scarcity of tourism consumption statistics. As a result, it is difficult to quantify the tourism stripping coefficient when calculating tourism contribution in Shandong. From a supply perspective, some new tourism industries are not included in the national economic statistics system, and there is no specific survey to determine the proportion of tourists consumed by tourism characteristic industries. Additionally, unlike the TSA in Australia, countries and regions use varied survey and statistical approaches in China. Even the National Bureau of Statistics and the National Tourism Administration lack a standardized method of measurement. As a result, it is impossible to reconcile RTSA with the national TSA, and it cannot draw provincial comparisons. The most critical goal is to develop a tourism statistics index system around

tourism value-added and tourism consumption to meet the TSA's compilation standards to address the issues mentioned above. And then to fine-tune the categorization of tourism characteristic industries.

The second issue is demonstrated by comparing the SDTSA and QDTSA. Australia's RTSA is relatively advanced compared to the rest of the world, and even small regions such as central cost are encouraged to establish a TSA. Additionally, Australia is the only country that calculates the economic contribution of tourism to the regional economy using the same methodologies and definitions as the national TSA. As a result of the comparison, it was determined that collecting and keeping data for the RTSA in China would be a massive task. Simultaneously, it suggests that the RTSA should be more adaptable to an individual's circumstances.

Thirdly, China faces additional difficulties in determining the method for compiling RTSA. Without an established national TSA, the top-down approach is challenging to implement in China's RTSA. As a result, there is a stronger inclination to employ the bottom-up method in creating Shandong TSA for 2012 and 2017, combining Shandong's input-output table with regional consumption data.

The fourth issue, which is the most prevalent in TSA, is complexity and lag. Because establishing the TSA is a lengthy and costly process that frequently results in delayed publication. As a result, it restricts the usage of TSA in practice.

According to the information above, one of the most successful suggestions for resolving these issues is big data. The first step in applying big data to tourism would be to determine the component of tourism consumption to derive the tourism stripping coefficient for tourism-specific industries. Second, big data expands the breadth of tourism data gathering and increases tourism statistics' accuracy and efficiency. Moreover, the researchers used

Guangdong province as a pilot to build a Web-based TSA that increases TSA's efficiency and practical use, which is a trend for resolving lag issues.

However, because establishing a TSA is a highly complex procedure and missing information, additional research in the following areas is necessary.

1. Because the tax rate is omitted in Chapter 4 when computing the TVA, it should be carefully considered when sorting the consumption data in the future to ensure data accuracy.

2. While big data has numerous benefits, it also presents security, structure, and technology challenges. As a result, further research is required to see how it might be implemented more effectively in tourism.

3. In addition to the general survey, it is necessary to conduct a specific study for emerging tourist types. For example, AirB&B has become a popular choice for travelers, but standard accommodation does not include AirB&B. As a result, it is preferable to conduct further surveys to have a more comprehensive tourism picture.

# Reference

## In English:


APEC. (2010). *The Implementation of Tourism Satellite Accounts in the APEC Region: 2009 Survey and Best Practice*. Singapore: APEC TOURISM WORKING GROUP

Australia Bureau of statistics. (2018). *Australia National Accounts Tourism Satellite Account 2016-2017 (Cat.No.5249.0)*. Canberra

Borras, J., Moreno, A., & Valls, A. (2014). Intelligent tourism recommender systems: A survey. *Expert Systems with Applications, 41*(16), 7370-7389.

Buccellato, T., Webber, D., & White, S. (2010). The Experimental Tourism Satellite Account for the United Kingdom (E-UKTSA). *Economic & Labour Market Review, 4*(10), 39-61.

Burkart, A. J., & Medlik, S. (1981). Tourism: past, present and future. *Heinemann*(Ed.2).

Dwyer, L., Forsyth, P., Spurr, R., & Ho, T. (2005). New South Wales Tourism Satellite Account. *Sustainable Tourism Cooperative Research Centre, Technical Report, February, http://www. crctourism. com. au/CRCBookshop*.

Frechtling, D. C. (1991). Improving the World's Tourism Statistics: Recommendations of an International Conference. *Journal of Travel Research, 30*(2), 49-51. doi:10.1177/004728759103000211

Frechtling, D. C. (1999). The tourism satellite account: foundations, progress and issues. *Tourism Management*.

Frechtling, D. C. (2009). Measurement and analysis of tourism economic contributions for sub-national regions through the Tourism Satellite Account. *Enzo Paci Papers, 6*, 189-206.

Frechtling, D. C. (2010). The tourism satellite account: A primer. *Annals of Tourism Research, 37*(1), 136-153.

Frenț, C., & Frechtling, D. C. (2020). Regional tourism satellite accounts: towards international comparability. *Tourism Review*.

FrenȚt, C., & Frechtling, D. C. (2015). Assessing a Tourism Satellite Account: A Programme for Ascertaining Conformance with United Nations Standards.

Gilbert, D. C. (1990). Conceptual issues in the meaning of tourism. *progress in tourism recreation & hospitality management*.

Grimm, C. (1991). Satellite Accounts in a Modernized and Extended System of Economic Accounts. *Business Economics, 26*(1), 58-63.

INRouTe. (2016). Tourism, territory and sustainability: a statistical insight at subnational levels – towards a set of UNWTO guidelines. Retrieved from www.inroutenetwork.org/wp-content/uploads/2016/12/INRouTe2016.pdf

Jones, C., & Munday, M. (2010). Tourism satellite accounts for regions? a review of development issues and an alternative. *Economic Systems Research, 22*(4), 341-358.

Jones, C., Munday, M., & Roberts, A. (2003). Regional tourism satellite accounts: A useful policy tool? *Urban Studies, 40*(13), 2777-2794.

Jones, C., Munday, M., & Roberts, A. (2009). Top down or bottom up? Issues in the development of sub-national tourism satellite accounts. *Current Issues in Tourism, 12*(4), 301-313.

Kozo, M., Fumikado, Y., Etsunobu, K., & Taku, K. (2015). *Tourism Statistics and TSA Compilation Methods in Asian countries*. Paper presented at the 27th Joint Meeting of the UNWTO Commission for East Asia and the Pacific & the UNWTO Commission for South Asia, Maldives.

Lamsfus, C., Martin, D., Salvador, Z., Usandizaga, A., & Alzua-Sorzabal, A. (2009). *Human-Centric Ontology-Based Context Modelling In Tourism.* Paper presented at the The 4th Mediterranean Conference on Information Systems, MCIS 2009, Athens University of Economics and Business, AUEB, Athens, Greece, 25-27 September 2009.

Libreros, M., Massieu, A., & Meis, S. (2006). Progress in tourism satellite account implementation and development. *Journal of Travel Research, 45*(1), 83-91.

Meis, S. M. (1999). The Canadian experience in developing and using the tourism satellite account. *Tourism Economics, 5*(4), 315-330.

Norbert , V. (2017). *The Economics of Tourism Destinations*. London: Routledge.

Nordström, J. (1996). Tourism Satellite Account for Sweden 1992–93. *Tourism Economics, 2*(1), 13-42. doi:10.1177/135481669600200102

Pham, T. D., Dwyer, L., & Spurr, R. (2008). Constructing a regional tourism satellite account: the case of Queensland. *Tourism Analysis, 13*(5-6), 445-460.

Philip D. Adams, M. H., Glyn Wittwer. (2003). MMRF-GREEN: A Dynamic Multi-Regional Applied General Equilibrium Model of the Australian Economy, Based on the MMR and MONASH Models.

Ricci, F. (2002). Travel recommender systems.

Smith, S. L. J. (2004). *Broadening the viewpoints of Tourism measurement*. Beijing: China Statiscs Press.

Smith, S. L. J., & Wilton, D. (1997). TSAs and the WTTC/WEFA Methodology: Different Satellites or Different Planets? *Tourism Economics, 3*(3), 249-263. doi:10.1177/135481669700300304

Suich, H. (2010). Development of preliminary tourism satellite accounts for Namibia. *Development Southern Africa, 19*(1), 105-121. doi:10.1080/03768350220123936

System of National Accounts 1993. (1993). *System of National Accounts 1993*. Brussels/Luxembourg,New York, Paris,Washington,D.C.: European Commission,International Monetary Fund,Organisation for Economic Co-operation and Development,United Nations,World Bank

System of National Accounts 2008. (2009). *System of National Accounts 2008*. Brussels/Luxembourg,New York, Paris,Washington,D.C.: European Commission,International Monetary Fund,Organisation for Economic Co-operation and Development,United Nations,World Bank

Tourism Research Australia. (2019a). *State Tourism Satellite Account 2017-2018*. Canberra

Tourism Research Australia. (2019b). *Tourism Satellite Account - summary of key results 2017-2018*. Canberra

TRA. (2019). *Tourism Satellite Account - summary of key results 2017-2018*. Canberra

TSA:RFM. (2008). *Tourism Satellite Account: Recommended methodological framework.* Retrieved from Madrid:

UN. (1994). *Recommendations on Tourism Statistics*. New York: Department for Economic and Social Information and Policy Analysis,World Tourism Organization,United Nations

UNWTO. (2010). *TSA Data around the world*. Madrid: United Nations Statistics Division,Statistical Office of the European Communities,Organisation for Economic Co-operation and Development,World Tourism Organization

UNWTO. (2013). *Regional Tourism Satellite Account*. Retrieved from Madrid

Van Ho, T., Pambudi, D., Forsyth, P., Spurr, R., Dwyer, L., & Hoque, S. (2009). Development of Regional Tourism Satellite Account: A Case Study from Australia. *Enzo Paci Papers. Vol, 6*, 345-358.

World Economic Forum. (2019). *The Travel & Tourism Competitiveness Report 2019*. Retrieved from Geneva:

WTTC. (2019). *Travel&Tourism Global economic impact &Trends 2019*. Retrieved from United Kingdom:

Wu, D. C., Liu, J., Song, H., Liu, A., & Fu, H. (2019). Developing a Web-based regional tourism satellite account (TSA) information system. *Tourism Economics, 25*(1), 67-84.

## In Chinese:

Chang, L., Kang, R., & Kuang, L. (2005). In-depth Reflections on theMeaning and Characteristics of Tourism Satellite Account. *Tourism Scinence, 19*(4), 17-21.

Cheng, Y., Yang, Y., Liu, Z., & Xiong, D.-D. (2020). Review and prospect of tourism development in China. *East China Economic Management, 34*(3), 1-9.

Dai, B. (2017). Big data on tourism. *People's daiily*.

Dai, X.-F. (2016). A discuss of tourism figues from the National Bureau of Statistics and the National Tourism Administration. *TOurism Tribune, 31*(3), 9-11.*Tourism Economics, 21*(3), 543-559. doi:10.5367/te.2014.0368

Ge, Y.-Q. (2007). Research on the development and method of tourism satellite account. *TOurism Tribune, 22*(7), 11-18.

Hu, X.-M. (2015). On Development of China's System of National Accounts and Suggestions for Improvement. *Journal of Statistical Science and Application, 3*(11-12), 203-208.

Huang, N., Liang, Z.-J., & Zhao, J.-Y. (2009). A Study on the Development of Tourism Satellite Account and theRelationship between Tourism Satellite Account and System of National Accounts. *Journal of Jincheng Institute of Technology, 2*(1), 87-90.

Jiang, P., Liu, D.-D., & Wang, Y. (2013). Recent Progress of SNA Study: Central Framework，Satellite Accounts and Extended Study. *Statistcal Research, 30*(3), 3-9.

JS-TSA. (2006). *The research of Jiangsu Tourism satellite account 2002*. Nanjing, Jiangsu: Jiangsu People's Publishing Agency.

Kang, R. (2006a). The Demand-Supply Data Reconciliation of Canadian TSA and its enlightenment. *Economic Management & New Management, 4*(8), 93-96.

Kang, R. (2006b). Tourism satellite account and the calculation of the Tourism Value added. *Estate Observation*(5), 78-80.

Kang, R. (2011). *The significance, method and difficulty of establishing tourism satellite account*. Beijing: Economic Press China.

Li, J. (2006). Reflection on the necessity of establishing and perfecting the tourism satellite account in China. *Comtemporary Manager, 21*, 1667-1668.

Li, J. (2007). *Tourism Satellite Account and Research on Tourism statistics*. Beijing: Chian tourism publication.

Li, J., & Li, Y. (2011). *Tourism Satellite Account——theory and case*. Tianjin: Nankai University publication.

Li, J.-F., & Li, M.-Y. (1999). On the Calculation of Tourism Industry and Tourist Adding Value. *TOurism Tribune*(5), 16-19.

Li, M.-Y. (2008). *Research on theory and application of regional tourism satellite account.* (Doctor). Hohai University, Nanjing,China.

Li, Q. (2012). A Research on the Transition of the Investigation Modes in Domestic Tourism Statistics. *Journal of Taishan Universtiy, 34*(5), 77-80.

Li, S.-W. (2015). Improvement of national economic accounting system in big data environment. *Market economy & Price*(7), 10-14.

Li, Y., & Li, J. (2012). *Research on the absence and improvement of China's tourism statistical indicators from the perspective of tourism satellite accounts*. Paper presented at the China tourism academy summit, Beijing.

Liu, D.-R. (2018). The impact of big data on the quality optimization of tourism statistics. *Vacation tour*(07), 21 and 26.

Ma, Y.-J. (2007). *Methodological Frame and Empirical Study of Regional Tourism Satellite Account-Using Shandong Province as an Example.* (Master). Ocean University of China, Qingdao,Shandong.

Ma, Y.-L. (2011). Economic analysis to several important issues of the tourism industry. *economic geography, 31*(5), 852-856.

Ma, Y.-L. (2017). The connotation interpretation and calculation method optimization of tourism economic contribution. *China Tourism Review*(1).

MInistry of Culture and tourism of the people's republic of China. (2010-2019). *The yearbook of China tourism statistics 2010-2019*. Beijing: China Travel & Tourism Press.

Shandong Provincial Bureau of Statistics, & Survey Office of the National Bureau of Statistics in Shandong. (1995-2016). *Shandong statistical Yearbook*. Beijing: China statistics Press.

Shandong Tourism Satellite Account Compiling Group. (2012). *Shandong Tourism Satellite Account Establishment and Application Research*. Jinan,Shandong: Shandong University.

Shen, X.-P., & Zhang, J.-C. (2017). Linkage Effects of Beijing's Cultural and Creative Industries. *Creative Economy, 1*(1), 105-110.

Song, Z.-W. (2007). A Research on Industrial Correlation of China's Tourism Industry: Based on the Input-output Model. *Tourism Science, 21*(2), 7-13.

Tourism Bureau of Guangxi Zhuang Autonomous Region. (2004). *Research on the tourism contribution percentage to the national economy*. Beijing: China tourism publication.

Wang, J. (2008). Analysis of the present situation of tourism statistics in China. *Nei Mong Gu Statistics, 1*, 41-42.

Wang, X.-L. (2018). The application of big data in Tourism statistics. *Industrial & Science Tribune, 17*(23), 47-48.

Wen, L., & Li, Y. (2017). Big data and tourism statistics. *TOurism Tribune, 32*(9), 6-8.

Xiao, Y.-J. (2007). The research of regional tourism satellite account based on " SNA93-TSA". *Statistics&Decision, 23*, 64-66.

Xing, L., Fu, J.-H., & Zhang, W.-J. (2017). Application and Evaluation of Tourism Statistics System in Yunnan Province. *Tourism Review, 3*, 170-179.

Xu, X.-C. (2014). On the revision of our national economic accounting system. *Globalization*(1), 14-20.

Xue, Y. (2012). Study of updates and implications of international recommendations for tourism statistics andrecommending methodological framework for tourism satellite account. *Tourism Research, 4*(2).

Yan, H.-L., & Xiong, H. (2017). *Input-output analysis of tourism economy*. Beijing,China: Scinece Press.

Yang, X.-J. (2016). Analysis on the compilation method of regional TSA and the thinking of "localization" of content. *Statistics and Management*(12), 44-46.

Yang, Y. (2018). *Tourism economy*. Shanghai: Shanghai Jiao Tong University Press.

Ye, Y.-L. (2003). *The Research on tourism survey statistics— theory , method and case studies.* (Doctor). Xiamen University, Xiamen,China.

Zhang, J. (2005a). Documentation on regional tourism satellite accounts in Denmark. In: March.

Zhang, J. (2005b). *Regional tourism satellite accounts for Denmark: accounting and modelling*: Paper presented at the 15th International Input-Output Conference.

Zhang, J., Madsen, B., & Jensen-Butler, C. (2007). Regional economic impacts of tourism: The case of Denmark. *Regional Studies, 41*(6), 839-854.

Zhang, L.-Y. (2000). On the status of tourism industry in regional economic development and several issues of industrial policy. *TOurism Tribune, 22*(4), 15-19.

Zhao, H. (2011). *Progress of the National Statistics Bureau's participation in the OECD Data Disclosure Programme*. Retrieved from OECD:

Zhao, L.-X., & Wei, W.-X. (2001). Tourism satellite account(TSA)-1998. *Statistical Research, 8*, 13-17.

Zhu, H.-B., & Noel, S. (2016). Current state, challenges and trends of tourism statistics in Australia. *TOurism Tribune, 31*(4), 1-3.

Zhu, Q.-H. (2009). A brief analysis of the establishment and innovation of China's tourism satellite account. *Comtemporary Economics*, 60-61.

# APPENDIX

## Interview

Interviewee：Mr. Zhang MingChi, Deputy Director of Shandong Tourism and Culture Department.

Interview time：The first time is 2021.05.16

The second time is 2021.06.02

### 现状：Current status

1. **Interviewer:**

山东旅游在整个山东经济发展中所处的地位，为山东经济发展做出了哪些突出贡献？

What is the position of Shandong tourism in the overall economic development of Shandong, and what outstanding contributions have been made to the economic development of Shandong?

**Zhang:**

山东目前是旅游大省，但不是旅游强省，在中国的整个旅游板块里边还是比较重要的。山东省在接待人数方面排全国第二或者第三，旅游消费或者收入排在第二或第三，有的时候在消费或者收入这一块排到第四，广东、江苏、浙江排在前边。山东旅游这些年的发展还是不错的，无论是我们的生态旅游还是文化旅游。尤其山东的文化，山东的山和海都有自己的文化因素，比如崂山——海上第一名山；泰山——五岳之首。再加上山东是孔孟之乡，这种文化底蕴是任何地方没法比的。现在，中国政府将文化和旅游融合在一块，这样更加提高了山东旅游的发展前景。

Shandong is a significant tourism province at the moment, but not a strong tourism province, despite its continued importance in China's overall tourism sector. Shandong Province is the second or third largest in the country in terms of people arrivals. Tourism revenue is second or third, occasionally fourth, with Guangdong, Jiangsu, and Zhejiang ranking first. Shandong's tourism industry has grown steadily over the years, particularly in ecological and cultural tourism. Shandong's culture is particularly distinctive; the mountains and sea of Shandong each have their cultural characteristics, such as Laoshan - the first mountain on the sea; and Mount Tai - the first of the five mountains. Additionally, Shandong is the birthplace of Confucius and Mencius; any other location cannot match this cultural history. The Chinese government has now combined culture with tourism, greatly enhancing Shandong tourism's development possibilities.

**Interviewer:**

我一直很好奇为什么广东会排在第一名？

I've always wondered why Guangdong is in first place?

**Zhang:**

广东是经济发达的地方。让我来跟你解释一下，比如山东的居民去广东打工，从旅游层面来说，打工就是人流量。另外仅仅香港到深圳过关，这也是算出游率。比如，澳门、香港的居民到广东买菜，这么算下来，一整年的出游率就非常高。整个港澳居民的百分之八十到九十都从广东这个地方入关进入内地。另一方面，港澳也算是入境，中国整个的入境这一块，广东占 40%。另外，现在到深圳旅游，到广州旅游，到珠海旅游，这些发达的地方，外边去的人也多。一个经济发达的地方，相对的各个方面都比较发达，旅游发展的也比较好，可参观的旅游目的地也比较多。另外，广东现在人口是 1.2 亿，

是第一人口大省。人们选择旅游目的地，绝大部分是省内游，大省就是说外地人去的多，另外自己本身的这种人流量也大，接待人数就大了。凡是经济强省，经济好的地方，老百姓本身出游率就高，比如青岛市居民的出游率就肯定比周边其他农村地区居民高。再一个就是他的每个人的消费的标准高，旅游的质量高，所以它的整个的旅游的收入也高。所以说一个规律，凡是旅游强省必然就是经济强省。国家也一样，凡是旅游强国必然是经济强国。富裕的地方，经济发达的地方，旅游业发达，有钱了才能建景区，吸引更多的人，刺激更多的消费。所以说广东排在第一，一个是人口本身就多，第二经济发达，再一个它特殊的地理位置，靠近港澳。再加上深圳本身就是移民城市，从外地去的人又比较多。

Guangdong is a prosperous province economically. Allow me to explain. On the one hand, residents of Shandong travel to Guangdong to work within a year; in terms of tourism, this area belongs to visitors. Additionally, Hong Kong residents traveled to Shenzhen, which is included in the travel rate for the entire year. For example, Macau and Hong Kong inhabitants travel to Guangdong to purchase food, resulting in a high travel rate. Eighty to ninety percent of Hong Kong and Macao residents enter the mainland via Guangdong.

On the other hand, Hong Kong and Macao are also considered to be the registration of entrance, accounting for the entirety of China's entry, with Guangdong accounting for 40%. Additionally, Shenzhen, Guangzhou, and Zhuhai are attracting an increasing number of visitors. Economically developed, significantly more developed in all areas, tourism development is also improved, with more tourist attractions to visit. Additionally, Guangdong currently has 120 million, making it the country's most populated province. Individuals select tourism destinations, which account for the great majority of provincial tourism. A vast province, that is, attracts not only visitors from outside but also their citizens, resulting in a high rate of reception. For example,

people of Qingdao travel at a significantly higher rate than residents of other rural places. Another factor is that because each individual's consumption standard is high, the quality of tourism is high, the overall tourism revenue is also high. Thus, a prosperous tourism province is inextricably linked to a robust economic province, just as a strong tourism country is inextricably linked to a strong economic country. Economically developed areas with developed tourism have sufficient funds to construct scenic spots that attract additional visitors and drive additional consumption. Thus, Guangdong is ranked first for three main reasons: one, its population is more significant, and two, its economy is more developed. And then there's one of its unique geographical characteristics, being adjacent to Hong Kong and Macao. Additionally, Shenzhen is a metropolis of immigrants.

2. **Interviewer：**

到目前为止，山东旅游的发展都经历了哪些比较重要的阶段，发展过程中有什么特点，取得哪些重要成果？

So far, what are the more critical stages in the development of tourism in Shandong, what are the characteristics of the development process, and what actual results have been achieved?

**Zhang：**

山东旅游的宣传，山东旅游的形象，我感觉在全国是最好。山东品牌的打造都录入哈佛商学院案例。所以在营销这一块，关于山东品牌的营销，它的评价值绝对在全国是最高的。这一点上山东还不错. 另外山东旅游的发展的层次这几年进步不少，因为原来咱的乡村旅游是很差的，这几年发展的很好，好多精品民宿就干的非常好。整个海洋旅游这一块，目前的海洋牧场百分之七十到八十是都是属于山东, 山东是非常领先的。关于文

化旅游方面，山东有文化，包括泰山，曲阜这都是文化，包括青岛的崂山也是道教文化。山东在文化旅游这个方面，其他地方是没法比的，整个山东的文化旅游这一块一直是很重要的。

Shandong tourism's publicity and image, I believe, are the greatest in the country. Shandong brand development is documented in a Harvard Business School case study. Thus, when it comes to promoting the Shandong brand, its valuation is unquestionably the greatest in the country. Additionally, Shandong's level of tourism development has improved significantly over the last few years since our rural tourism was significantly underdeveloped previously. However, the growth over the previous few years has been very positive, with many B&Bs doing an excellent job. The entirety of maritime tourism is currently devoted to marine ranching; seventy to eighty percent of marine ranching occurs in Shandong, making Shandong a market leader in marine ranching. On the subject of cultural tourism, Shandong possesses culture, including Mount Tai and Qufu, and Qingdao's Laoshan, which is also Taoist culture. The entire Shandong cultural tourism has been a significant piece.

**3. Interviewer：**

请问山东省旅游发展面临的困难或问题是什么？

What are the difficulties or problems facing the development of tourism in Shandong Province?

**Zhang:**

旅游的品质、质量在全国不是最好的, 它与海南，贵州，云南、四川、北京、上海、广东、江苏这些地方很难比较，跟他们确实有点差距，也必须承认这里面有咱自己本身的问题，知名度不够高。比如说，日韩因为离山东近，可能从山东入境，但只要是其他的外国人，想来中国，主要是选北京。

同样，我们到美国旅游，首先会想去纽约，不可能先飞到西雅图，虽然它的知名度也高。我们第一次到日本，也会选择东京或者是大阪，其他地方都是去了几次以后再考虑。山东面临同样的问题，山东不能代表中国，能代表中国就是北京、西安、上海这些地方，它们有各方面的优势。

另一方面，就是咱们旅游产品的品质，旅游产品还需要跟广东学习，广东就引领整个旅游的潮流，比如世界之窗，至少30年了，到现在还在盈利。另外长隆动物园，他都是引领整个旅游的概念性的颠覆。所以说它旅游的发展的品质，层次都是很好的，这都是北方比不了的。还有一点就是，山东在自然景观方面也没法跟浙江，江苏，云南也没法比。还有一个就是季节，在北方，旅游到冬天就不行了，晚上也不行了。这些年启动的夜生活，冬季旅游打造的不足，这一方面因素，造成这种旅游的发展层次，旅游的品质，以及旅游的效益都是比较差的。

The quality of tourism is not the best in the country. It is difficult to compare with Hainan, Guizhou, Yunnan, Sichuan, Beijing, Shanghai, Guangdong, Jiangsu, and we must admit that there is our problem. The band is not sufficiently well-known. Japan and South Korea, for example, may enter through Shandong due to its proximity to Shandong, but as long as other foreigners wish to visit China, they will primarily select Beijing. Similarly, when we visit the United States, we will most likely fly to New York first, rather than Seattle, despite its high exposure. When we visit Japan for the first time, we will also choose between Tokyo and Osaka, with additional locations being explored after several visits. Shandong suffers the same issue; Shandong cannot represent China; only Beijing, Xi'an, and Shanghai can; these cities have a number of advantages. On the other side is the quality of our tourism products; tourism products still need to learn from Guangdong; Guangdong will lead the entire tourism trend for at least 30 years, such as the World Window. Additionally, Changlong Zoo is a pioneer in the subversion of the tourism concept. Thus, the quality of its tourism development is excellent, far exceeding that of the north.

Another criticism is that Shandong's natural scenery is inferior to Zhejiang, Jiangsu, and Yunnan. Another factor is the season; in the north, tourism does not operate in the winter, and it

does not work at night. These years have seen the emergence of nightlife and winter tourism, resulting in a deficiency in this element of the factors, resulting in tourism development, tourism quality, and tourism benefits being relatively low.

## 旅游统计方面问题：Tourism statistics

**4. Interviewer：**

一般情况下，都会用数据去证明所制定的政策是否有效，我了解到国家层面和地方层面的统计方式有所不同，请问山东有没有自己特色的统计方式？山东旅游统计面临的困难或问题是什么？

In general, data are used to prove the validity of the policies formulated. I understand that the statistics are different at the national level and the local level. Does Shandong have its special statistics? What are the difficulties or problems faced by Shandong tourism statistics?

**Zhang：**

我前两年曾经参与统计方面的工作，这两年就不经常参与了，相对知道的可能不是特别清楚。现在整个统计比前些年也在逐渐的完善和提升，国家正在想用一个统一的标准来解决问题。山东目前在统计方面主要有两个口径，一个就是叫人/天。比如说:一个人在山东住了 7 天，就是 7 个人/天。另外就是人/次。国内的方面来说，现在最比较客观和真实的一个办法，就是按过夜人数的统计。因为现在整个公安系统和住宿系统都是联网的，都是实名制的，基本上是相对比较可靠的。所以，这种情况下，国外和省外来的游客基本上统计还相对还是比较准确的。现在的统计方面相对的掌握的不是很准确主要就是省内游或者周边游，因为这种情况下，游客可能不过夜，基本上目前的这种统计都是抽样调查。因为旅游这个产业的独特性，它的统计是绝不可能 100%的准确。这几年，应该说山东和中国目前的统计指标也正在逐步的完善。整个统计的这种客观性和科学度也在不断的提高。

I used to participate in statistics work throughout the first two years, but not as frequently during the last two years, which may not be entirely clear. Now, the overall statistics are gradually increasing and upgrading. The country is attempting to resolve the issue by adopting a unified standard. Shandong now has two primary statistical units, one of which is termed persons/day. For instance, a person who lived in Shandong for seven days equals seven persons /day. The other is the person/times. Domestically, the most objective and practical metric is now the population count as determined by overnight tourists. Because the entire public security and accommodation systems are now networked. The tourists are registered by their real name. Hence, it is more dependable. Thus, figures on foreign and out-of-province tourists are still relatively accurate in this scenario.

In contrast, it is a bit challenging to master the accurate information about provincial tours and periphery tours, where tourists may not remain overnight. Essentially, present statistics related to them are a sample survey. Due to the industry's peculiarities, data can never be 100 percent accurate. It should be noted that during the last few years, statistical indicators in Shandong and throughout China have gradually improved. The impartiality and scientific rigor of statistics as a whole is also improving.

**5. Interviewer：**

我调查了一些资料，了解到 2008 年，山东尝试建立了旅游卫星账户，但是之后就没有下文了，请问现在山东旅游卫星账户的发展是怎样的现状？

I have investigated some information and learned that in 2008, Shandong tried to establish a tourism satellite account, but there was no further development after that.

**Zhang:**

这几年对卫星账户的研究不是很多,2011 年的时候对各个省还有过要求，但是这些年推广的不是特别好。

In the past few years, not much research has been done on satellite accounts, and there was a requirement for each province in 2011, but the promotion has not been perfect over the years.

**6. Interviewer：**

您怎样评价旅游卫星账户？如果山东想要建立旅游卫星账户，您认为存在的困难有哪些？

How do you evaluate the tourism satellite account? If Shandong wants to establish a tourism satellite account, what do you think are the difficulties?

**Zhang:**

其实我认为最主要的就是统计方面有比较大的问题，像内陆的各个省份之间的移动是很难统计的。比如：青岛市跟烟台交界的地方，现在就没有很好的统计方式。从理论上来说，旅游卫星账户是个很好的办法，但是他现实操作确实有好多困难。但如果足够重视，投入一定的资金，有一定的人力是可以做到的，虽然不能做到100%，但是能够做得更好。旅游统计的目的是为了决策，为我们提供参考和依据，然后进行分析。旅游卫星账户，关键就是时间、精力、资金的投入，一些偏远落后地区没有足够的财政，所以他们不可能去建立旅游卫星账户。但是，卫星账户是一个好办法，在现代旅游这么一个情况之下，它是一个趋势或者也应该是长久发展的一个目标。但是在推行的过程之中，尤其是在旅游发展初级阶段的国家，以观光为主的国家现在还不是发展的重点。它不像到了一个旅游比较成熟比较完善的国家，游客到那个地方就会呆比较长的时间。比如说我到新加坡，我就呆一星期，这样就比较容易统计，不需要花费太多的代价去提取各种数据。那么随着旅游业的发展，旅游消费层次的提高，从现在的以观光为主到休闲度假为主的，到了这个时期，卫星账户的推进和实施可能更容易。

旅游卫星账户这个方向是没问题的。日本的卫星账户比咱们要好得多，但是在实施方面也是存在一些困难的。

Indeed, the primary issue is that statistics have a relatively large problem, as travel between the many provinces' interiors is challenging to count. For instance: Between Qingdao City and Yantai, there is currently no reliable method of counting. While the tourism satellite account is an excellent idea, its practical implementation presents numerous obstacles. However, if sufficient attention is devoted to investing a specific amount of money and a certain number of effort, it is possible to perform better than 100%. The goal of tourism statistics is to aid in decision-making by providing a reference and a foundation for analysis. The key to tourism satellite accounts is investment of time, energy, and money. Because some rural and backward locations lack financial resources, they are unable to build tourism satellite accounts. However, the satellite account is a viable option since it is a trend or a long-term development of a goal in today's modern tourism environment. However, in the implementation process, particularly in countries where tourism is in its infancy and tourism is not yet the primary emphasis of development, it is not yet the focus. Unlike in more developed and better-developed tourism countries, visitors to that location will stay longer. For instance, if I travel to Singapore, I will remain for a week, making it easy to count and does not require an excessive amount of money to extract all types of data. Then, when tourism develops and tourism consumption levels shift from present tourism-oriented to leisure and vacation-oriented, the satellite account may become easier to advertise and implement throughout this period. The direction of the tourism satellite account is correct. Japan's satellite account is far superior to ours. However, there are some implementation issues.

**7. Interviewer：**

许多文献资料都指出了中国旅游统计存在了旅游统计口径小的问题，尤其在数字相关指标这一方面。我了解到现有的旅游统计仅对入境旅游有旅游消费调查， 但是国内旅游好像没有，请问我省在针对统计口径小这一问题有没有解决措施？

A lot of literature has pointed out the problem of tourism statistics in China, especially in valuable indicators. I understand that the current tourism statistics only have tourism consumption surveys for inbound tourism but not domestic tourism. Is there any measure to solve this problem in our province?

**Zhang:**

其实这方面也有分析，但这个分析的具体的模型我不清楚，但主要还是集中在旅游特征明显的产业方面。比如说住宿和饮食方面，一个游客在吃和住方面占多大比例，它有很详细的分析。这几年，我们国内的对旅游这些方面的分析也是还是比较先进的，比如说我们国家有专门有一个旅游数据中心。它主要分析人员来源、年龄结构、性别结构、消费喜好、住宿消费层次等。

There is an analysis in this area, but the specific model of this analysis is not clear to me, but it is mainly focused on the industry aspects with clear tourism characteristics. For example, in terms of accommodation and food, what percentage of a tourist is in food and accommodation has a very detailed analysis. In the past few years, our domestic analysis of these aspects of tourism is also relatively advanced. For example, our country has a special tourism data center. It mainly analyzes the source of people, age structure, gender structure, consumption preferences, accommodation consumption levels, etc.

**8.Interviewer：**

您认为大数据在我省旅游统计方面有哪些作用，应用前景如何？

What do you think is the role of big data in tourism statistics in our province, and what are the prospects for its application?

**Zhang:**

大数据应该说它的应用非常重要，因为它应用前景应该是非常光明非常远大。大数据它有两个情况，一个是现在随着我们信息化的发展，大数据的收集非常便捷，自然的生成。尤其中国在通过防疫之后，任何东西都是实名的，所以说中国对各个方面的信息和数据资料的掌握是最全的。在大数据方面，中国是世界上任何一个国家没法和我们媲美的，我们有14亿人，这样就有14亿个样本，里面就是有无尽的财富，从中加以认真的分析，才能找到很多规律性的、有参考性的有价值的东西。现在我们大数据中国的大数据发展非常好，贵州是大数据中心，全世界的大数据会议都在中国举行。现在中国的大数据的目前的发展规模，发展水平，发展的速度以及未来的发展前景都是非常好的，那么这时候在旅游方面的数据更重要了。针对着数据进行各个方面细分析，分析游客的喜好，根据他的喜好设计制造适合他需要的旅游产品。对一个旅游企业来说，想采用什么样的方式来吸引游客，那就看游客喜欢什么东西。今年这几类游客最多，就朝着这个方面的发展。比如游客从哪个方面，用什么方式影响他到一个地方旅游，我们可以研究他的信息获得渠道是什么？然后投放广告宣传，大数据可以使我们进行精准化的产品打造，打造精准化的服务，提供精准化的宣传营销，所以这个东西在旅游方面的影响是非常大的作用。根据游客的交通的偏好，就可以设计各个地方的交通布局。它使旅游产品更能够有针对性的，针对游客提升旅游的品质，满足旅游客更大的需要，从而旅游业发展的品质它就上来了。所以大数据的作用在各个领域都很重要，在旅游领域表现更加重要，前景很好。

It should be said that big data's application is critical, as its application prospects should be extraordinarily brilliant and ambitious. Big data exists two situations. The first is that with the advancement of information technology, big data collection has become highly convenient and natural. Particularly in China, everything is in the actual name after passing the epidemic prevention, ensuring that China has the most comprehensive knowledge and data on all aspects. With 1.4 billion people, there are 1.4 billion samples, and each one contains an infinite amount of information that could be analyzed. Now, we have enormous data. China's big data development

is accelerating; Guizhou is the world's largest data center, and China hosts the world's largest big data conferences. Now that China's big data development scale, level, pace, and prospects are all extremely favorable, the importance of tourism data has increased. We can analyze all areas of data, research tourist preferences, and design and manufacture tourism products to meet their needs. For a tourism company, the best strategy for attracting tourists is determined by what travelers enjoy. For example, from which side and in what way does a tourist influence him to travel to a place? We can study what his channels of information acquisition are? Then, when it comes to advertising, big data enables us to manufacture accurate products, provide good service, and provide precise publicity and marketing, all of which have a significant impact on tourism. It is possible to design the traffic pattern of each location based on tourist preferences. It makes tourism products more targeted at tourists, increasing the quality of tourism, meeting the increased needs of tourists, and thereby increasing the quality of tourism development. Thus, the role of big data is critical in all industries, but particularly in tourism, where performance is critical, and the prospects are excellent.

## 未来：Future

**9 .Interviewer：**

现阶段，山东旅游发展的重心和重点将是怎样?

At this stage, what will be the focus and emphasis of tourism development in Shandong?

**Zhang:**

山东下一步发展主要是提升旅游质量，从观光为主的旅游方式逐渐向休闲度假方式转变。提升质量的几个因素：第一，提升景区本身的档次，吸引更多的高端人群来。比如：建立更多的五星酒店。许多山东的城市都没有五星级酒店，这样外国人是不会来

的。许多外国人的旅游团，首要的要求就是高档层的住宿设施，而山东在这方面与其他省相比还是有很大差距。这些东西上不去，高端人群不来。尤其后疫情时代，出境游减少，原来选择出境游的人群开始选择到国内高端的旅游产品去消费。比如:高端的海上项目，我自己雇个小游艇，开到深海来去钓鱼、潜水等。现在高端消费其实占的比例还挺高的，要丰富旅游形式，不仅要有大众旅游、还要有小众旅游，高端旅游。第二，增加文化方面的体验，因为纯粹的自然景区方面的东西不是山东的优势，如果把精力都放在这个地方，没有什么多大的发展前景

第二，刺激旅游消费。山东旅游的人均消费比较低，像广东省，已经接近2000了，但是山东不到1000块钱。所以如果旅游品质提高了，旅游方式丰富了，层次提升了，有助于刺激消费。这是山东目前应该是重点需要关注的。

第三，改善冬季旅游跟夜间旅游。这些由客观造成的季节的问题也不是不能解决。比如：山东的台儿庄古城，这一年的收入冬季那几个月比夏季还好，过年期间的收入能占到它1/3的营收。他在宣传这一块做的非常好，春节的时候会有新年的主题。而且台儿庄古城，60%的收入在晚上。下午四、五点以后开始进人，各种酒吧，灯光，餐厅丰富了它的夜间旅游。虽然山东旅游有短板，但是许多问题都是能解决的。比如夜生活，虽然北方人的习惯是晚上不愿意出去，但是这些东西可以慢慢培育。另外就是冬季也可以开发一些冬季旅游产品，比如说温泉。山东的温泉也比较丰富，山东温泉在全国也是比较好的。还可以滑雪，包括人造雪。短板一旦拉长了，整个旅游发展的空间就大了。

第四，发展针对老年人的旅游项目。第七次人口普查结果已经出来了，目前山东省内60岁以上的老人占20.09%，接近21%。所以这种情况就说明老年旅游市场会越来越大。与之前的老年人不同，随着中国经济的发展和人类寿命的提升，这一阶段的老年人有足够的时间和金钱去享受生活。针对老年人的需要来开发旅游资源，提供服务，无论是从公益、社会责任还是经济的角度来讲都是值得研究的。

第五，发展海洋旅游。虽然山东半岛的海洋资源非常丰富，但都没有形成完整丰富的产业链。像海岛游，海上运动、帆船、快艇、海钓这些都刚开始。随着我们中西部城市的发展，人均收入的提升，他们旅游的首选可能就是出来看看海，到哪看海，山东还是最好的。除去海南，山东的海岸线是中国最好的。中国有四海，山东就靠近两个——渤海和黄海，没有任何一个省有这么得天独厚的地理优势。整个中国的好沙滩一半以上是都在山东地区，所以说山东发展旅游，发展海洋旅游有得天独厚的条件，山东的海产就比较好，山东的地面积陆域面积跟海域面积差不多，周边有很多海岛，沿海的城市都比较发达，而且沿海的文化比较好，有利于发展海洋旅游。

总的来说，只要我们按照整个发展的趋势逐渐提升，山东的发展旅游的发展还是很有前景的。

Shandong's next phase of development will improve tourism quality, transitioning gradually from sightseeing-based tourism to leisure and holiday modes. Numerous elements contribute to the quality of the product: To begin, to enhance the scenic area itself to attract more affluent visitors. For instance, increase the number of five-star hotels. Many cities in Shandong lack five-star hotels, deterring foreign visitors. Numerous international tourist tour groups have a primary necessity for a high-quality housing facility, and Shandong falls short in this regard compared to other provinces. Particularly in the post-epidemic era, outbound tourism declined, and they moved to spend on local high-level tourism products. For instance, when I worked on high-level maritime projects, I rented a small yacht and drove to the deep sea to go fishing, diving, and so on. Now, the proportion of high-level consumption is relatively large to enrich tourism by allowing for mass tourism and high-level tourism.

Second, to broaden cultural experience; because Shandong's pure natural picturesque area is not advantageous, concentrating in this area offers the slight possibility for development.

Thirdly, to stimulate tourism consumption. Shandong tourism per capita consumption is relatively low, like Guangdong Province, is close to 2000, but Shandong less than 1000 yuan. So if the quality of tourism has improved, the richness of the way to travel, the upgrading level, to help stimulate consumption. This is Shandong should be the focus of attention at present.

Fourthly，improve winter tourism and night tourism. These problems caused by objective reasons are not impossible to solve. For example, the ancient city of Taierzhuang in Shandong has a better revenue in the winter months than in summer. Its revenue during the New Year period can account for 1/3 of its income. He does an outstanding job of promoting a New Year theme during the Spring Festival. And in Taierzhuang Old Town, 60% of the revenue is in the evening. After 4:00 or 5:00 p.m., people start coming in, and various bars, lights, and restaurants enrich its night tourism. Although Shandong tourism has shortcomings, many problems can be solved. For example, nightlife. Although the northerners are not willing to go out at night, these things can be slowly cultivated. Another is that winter can also develop some winter tourism products, such as hot springs. Shandong's hot springs are also relatively rich and good. You can also ski, including artificial snow. Once the shortboard is lengthened, the entire tourism development space is enormous.

Fifthly. The development of tourism projects for the elderly. The seventh census results have come out, currently 20.09% of the elderly over 60 years old in Shandong Province, nearly 21%. So this situation shows that the elderly tourism market will become bigger and bigger. Unlike the elderly before, with the development of China's economy and the increase of human life expectancy, the elderly at this stage have enough time and money to enjoy their lives. To develop tourism resources and provide services for the needs of the elderly, it is worth studying both public welfare, social responsibility, and the economy.

Sixth, developing marine tourism. Although the Shandong is very rich in marine resources, none have formed a complete and rich industrial chain. Like the island tour, sea sports, sailing, speedboats, sea fishing, these are just beginning. With the development of our central and western cities, per capita income has increased. Hence, their first choice for tourism may be to come out to see the sea, where to see the ocean, Shandong is still the best. Apart from Hainan, Shandong's coastline is the best in China. China has four seas, Shandong is close to two - the Bohai Sea and the Yellow Sea, no province has such a unique geographical advantage. More than half of China's good beaches are in Shandong, so that the development of tourism in Shandong, the development of marine tourism has unique conditions. Shandong's seafood is relatively good, Shandong's land area is about the same as the sea area, there are many islands around, coastal cities are more developed, and the seaside culture is better, conducive to marine tourism development.

In general, as long as we follow the whole development trend gradually upgrade, tourism development in Shandong is still very promising.

# Acknowledgements

In October 2018, I started a new journey in the beautiful city of Sapporo, Hokkaido. I started my Ph.D. study with anxiety and excitement. Three years, short and beautiful, but also full of many challenges. At the end of 2019, coronavirus changed everyone's lives. It also added many obstacles to my study life. But thankfully, because of the tremendous support of many people, I completed this thesis finally. I want to take the opportunity to express my gratitude.

I am very grateful to my professor, Dr. ITO Akio, who has offered valuable opportunities, guidance, and help during these three years. His careful monitoring, persistent encouragement, inventive recommendations and critical comments contributed not only to complete the research but also to my professional and personal trust. I am grateful to have had him as a supervisor.

I also like to thank Dr. ABE Hideaki and Dr. SATO Hiroki, who are my associate examiners, give me helpful recommendations and warm encouragement. At the same time, I would like to thanks all the professors who taught me before, Dr. TAMURA Tohru, Dr. YAMADA Noriyuki, and Dr. ISHIHARA Kyoichi.

Furthermore, I would like to deeply thank Professor Su Lin, during the three years, she likes my mother gave me meticulous care; because of her, life in a foreign country becomes less difficult. As an international student, and I am not good at Japanese, Mr. Shibata really does me a great favor both in educational administration and daily life. Thank him very much indeed. I'd want to thank my colleagues at Hokkai School of Commerce as well. They provided me with a pleasant learning atmosphere at school and aided me greatly in acclimating to life in Japan. It is a true privilege for me to study and collaborate with them. We've shared so many wonderful experiences that I'll cherish for the rest of my life.

During these three years, I received warm hospitality at school. To enable us to devote more energy to our studies, the school provides us with free dormitories and opportunities to do

part-time jobs. Such conditions are beyond the reach of any school. I'd like to thanks to all the staff members at school.

My sincere gratitude also goes out to those who took the time to participate in my interviews and surveys; without your assistance, this thesis would not have been completed, and your assistance in providing the data and information required for this research has provided me with a rewarding research experience.

I'd like to convey my gratitude to my parents for their unconditional love. I wouldn't be as free to do what I want if they didn't back me. I come from a large family, which has influenced me to become an optimistic and independent person. Growing up in such a family is a wonderful experience. My good friends, you are my strongest support. Thank you for always being with me. Finally, I want to thank the person who will appear in the future, because I am waiting for your arrival with good expectations. The future has come.