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ZHANG LIANFENG

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ORGANIZATIONAL AND ECONOMIC BASIS OF TOURISM MANAGEMENT

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The use of ideas, results and texts of other authors have references to the relevant source _____ Zhang Lianfeng

ZHANG LIANFENG

数字签名由 张联锋
DN： C=CN, OU=Sumy National Agrarian University, O=Sumy National Agrarian University, CN=张联锋, E=zlfmail@hist.edu.cn
原因： 我是该文档所有者
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Scientific supervisor **Yuriy Danko** Doctor of Economic Sciences, Professor

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ABSTRACT

Lianfeng Zhang **Organizational and Economic Basis of Tourism Management** – manuscript.

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The tourism industry (tourism) occupies a prominent place in the economy of many countries. A person's desire to learn about new geographical objects, where historical monuments, architectural structures, recreational areas and much more are located, forces them to overcome significant distances and invest financial resources. Often, tourism turned out to be a decisive factor, the use of which made it possible to improve the entire domestic economy in different countries. In many countries, tourism is involved in the creation of additional jobs and employment, the formation of gross domestic product, and the activation of the foreign trade balance. Tourism is one of the most profitable businesses in the world and has an impact on such critical sectors of the economy as construction, production of consumer goods, transport and communications, and agriculture. According to the World Tourism Organization, tourism uses approximately 7% of the world's capital, and one in 16 jobs is associated with it. Tourism provides 5% of all tax revenues and accounts for 11% of global consumer spending. These data characterize the economic effect of the tourism industry, and this is one of the phenomena of the XXI century - developed tourism.

The dissertation examines the process of formation and development of the organizational and economic foundations of tourism management. It has been found that despite the challenges of recent years, such as the pandemic and military actions, globalization and the development of transport make people more willing to export tourism services. Studies have shown that in the pre-pandemic period, the number of tourists to China and Ukraine increased annually. In both countries, tourism, as a type of business activity, brought a lot of income and contributed to the economic development of both countries. In addition, tourism has been an important source of

foreign currency for China and Ukraine in their modernization. Therefore, tourism is an important industry both for China and for the post-war reconstruction of Ukraine.

It was determined that at the current stage of development, tourism in China is developing at a very fast pace. With the deepening of reforms and opening, more and more foreign tourists are coming to China to travel. In 2019, the total contribution of tourism to China's GDP was $979.153 billion, accounting for 10.5 percent of total GDP. In addition, China's GDP growth from nature tourism increased by 10.1 percent in 2019 compared to 2004. In addition, for Ukraine in the pre-war period, tourism was the main profitable industry, which for many years held the first positions in terms of foreign exchange earnings. In 2019, the total contribution of tourism to the GDP of Ukraine amounted to 347.7 billion dollars, which is 20.2 percent of the total GDP. In 2019, the total contribution of tourism to the GDP of Ukraine increased by 1.1 percent compared to 2013. In addition, according to the World Economic Forum's Global Tourism Competitiveness Report, China ranked 45th in 2013 and rose to 16th in 2019, indicating that China's tourism industry is developing rapidly and becoming more competitive. Due to the impact of the pandemic, income from tourism has fallen significantly. At the end of 2021, the total number and income of tourists in China's domestic tourism market recovered slightly from 2020, but still maintained a large gap with the level of 2019. China's domestic tourism revenue (total tourism consumption) was 2.92 trillion yuan in According to statistics from the Domestic Tourism Sample Survey released by the Ministry of Culture and Tourism, the figure increased by 0.69 trillion yuan or 31.0% in 2021. annualized (recovery to 51.0% in 2019). Of this figure, urban tourism consumption reached 2.36 trillion yuan, an increase of 31.6 percent; Rural tourism consumption was 0.55 trillion yuan, an increase of 28.4 percent. The characteristics of the development of China's tourism industry under the epidemic are as follows: peripheral tourism continues to be hot, urban tourism and rural tourism have become one of the hot spots of tourism, night cultural tourism has become a new growth point, and online tourism is integrating.

The publication analyzes the prospects for the development of the tourism sector of Ukraine for the near post-war future. Obviously, the development of the industry directly depends on how quickly Ukraine wins the war with Russia. Foreign tourists are expected to show interest in visiting Ukraine to visit cities that have survived despite constant shelling and missile attacks. Secondly, many Ukrainians who are currently unable to have a good rest or consider it inexpedient will want to recover and reboot with their families. Thus, both domestic and foreign tourism will develop at the same time.

If the war drags on, Ukrainian operators will enter the European market even more, opening their branches in the south of Ukraine, so that tourists can quickly fly on vacation immediately from Chisinau, Warsaw or Rzeszów.

We compared the tourism industry of China and Ukraine, analyzed the advantages and disadvantages of the tourism industry of the two countries, as well as combined our own practical experience to study the experience of the development of other countries, as well as proposed and used more appropriate countermeasures and proposals for the development of tourism.

The first section of the dissertation mainly deals with the theoretical and methodological foundations of tourism management. The conceptual and categorical apparatus related to the subject of research is analyzed. The key characteristics of the sphere of application of the tourism industry are defined. In the process of in-depth analysis, methodical approaches and indicators for evaluating the effectiveness of tourism activities are substantiated. To illustrate the method of evaluation and distribution of results, the example of 31 provinces in China is given. A large amount of data is considered to compare the best practices of different countries, especially with a developed tourism industry.

The second section systematically outlines the state of development of tourism management. The examples demonstrate the peculiarities of the development of tourism management in China and the pre-war state of tourism in Ukraine. The competitive strength of tourism development between China and Ukraine is compared. The first section of this chapter analyzes the features of the development

of the organizational and economic foundations of tourism management in China. The second section of this chapter examines the current state of Ukrainian tourism and compares the development of China and Ukraine with the theory of competitiveness. The third section of this chapter accordingly indicates the features of the development of tourism management in the future, including the current ecological environment, social environment, economic environment, technical environment, etc.

The third section proposes the organizational and economic mechanism for the development of the tourism industry, the organizational and innovative way and the economic basis. Planning and management of ecological tourism allows to fully take into account the theory of regional economic development, the theoretical method of environmental economy, as well as the regional integrated method of geography research, to carry out "intra-industry control and non-sectoral development", as well as to coordinate the solution of the contradiction between economic efficiency and environmental safety of ecotourism destinations. We have comprehensively analyzed the management mechanism of the tourism industry based on e-commerce, including travel e-commerce and its travel e-commerce platform. In the second section of this chapter, on the basis of deepening the understanding of the structure and functions of the eco-economic system of a tourist destination, a systematic study of the market of tourism services based on computer technologies is built.

A significant part of the research is devoted to trade in tourism services of one's own country in the context of global competitiveness. However, it is rarely possible to compare the international competitiveness of our country's tourism services trade with that of other countries. In particular, to compare the competitiveness of trade in tourism services between China and Ukraine. Therefore, in this work, a comparative study of the international competitiveness of trade in tourism services between China and Ukraine is carried out, as well as a differentiation of the relevant data of the two countries is carried out to obtain the existing problems and trends in the development of trade in tourism services

between China and Ukraine. The article uses indicators of international trade in services; International Market Share, International Competitive Advantage Index (TC) and Identified Comparative Advantage Index (RCA) are used to compare and investigate the competitiveness of trade in tourism services between the two countries, to comprehensively study trade in tourism services between the two countries, and to analyze the existing advantages and problems of trade in services between the two countries. In addition, the work combines quantitative analysis with qualitative analysis in order to contribute to the development of tourism in the studied countries. In the work, it is possible to follow the practical methods and policy of trade in services in the context of the implementation of the model of organizational and economic development of tourism.

Keywords: tourism, management, ecotourism, organizational and economic principles, competitiveness, sustainable development, tourism service, hospitality industry, Ukraine, China.

АНОТАЦІЯ

Лянфєнь Чжан **Організаційно-економічні основи управління туризмом.** – рукопис.

Дисертація на здобуття наукового ступеня доктора філософії (PhD) за спеціальністю 073 − Менеджмент. − Сумський національний аграрний університет, м. Суми, 2023 р.

Туристична галузь (туризм) займає чільне місце в економіці багатьох країн. Прагнення людини до пізнання нових географічних об’єктів, де розміщені історичні пам’ятки, архітектурні споруди, рекреаційні зони та багато іншого, змушує їх до подолання значних дистанцій та інвестиції фінансових ресурсів. Нерідко туризм виявлявся вирішальним фактором, використання якого дозволяло оздоровити всю внутрішню економіку в різних країнах. У багатьох країнах туризм бере участь у створенні додаткових робочих місць і забезпеченні зайнятості, формуванні валового внутрішнього

продукту, активізації зовнішньоторговельного балансу. Туризм є одним з найприбутковіших видів бізнесу у світі і здійснює вплив на такі критичні галузі економіки, як будівництво, виробництво товарів народного споживання, транспорт і зв'язок, сільське господарство. За даними Всесвітньої туристичної організації, туризм використовує приблизно 7% світового капіталу, і кожне 16-те робоче місце пов'язане з ним. Туризм забезпечує 5% всіх податкових надходжень і становить 11% світових споживчих витрат. Ці дані характеризують економічний ефект туристичної галузі, і це одне з явищ XXI століття - розвинений туризм.

В дисертаційній роботі досліджено процес формування та розвитку організаційно-економічних основ управління туризмом. Встановлено, що не зважаючи на виклики останніх років, як то пандемія та військові дії, глобалізація та розвиток транспорту змушують людей охочіше експортувати туристичні послуги. Дослідження показали, що в допандемійний період кількість туристів до Китаю та України зростала щорічно. В обох країнах, туризм як підприємницька діяльність, приносив великий дохід і сприяв економічному розвитку обох країн. Крім того, туризм був важливим джерелом іноземної валюти для Китаю та України в їх модернізації. Тому туризм є важливою галуззю як для Китаю, так і для повоєнного відновлення України.

Встановлено, що на сучасному етапі розвитку туризм Китаю розвивається дуже швидкими темпами. З поглибленням реформ і відкритістю все більше іноземних туристів приїжджають до Китаю подорожувати. У 2019 році загальний внесок туризму у ВВП Китаю склав 979,153 мільярда доларів, що становить 10,5 відсотка всього ВВП. Крім того, природне зростання туристичного ВВП Китаю зросло на 10,1 відсотка у 2019 році порівняно з 2004 роком. Крім того, для України туризм у довоєнний період був первинною прибутковою галуззю, яка протягом багатьох років утримує перші позиції за обсягами валютної виручки. У 2019 році загальний внесок туризму у ВВП України становив 347,7 мільярда доларів США, що становило 20,2 відсотка всього ВВП. У 2019 році загальний внесок туризму у ВВП України зріс на 1,1

відсотка порівняно з 2013 роком. Крім того, згідно зі звітом Всесвітнього економічного форуму «Глобальна конкурентоспроможність туризму», Китай займав 45-е місце в 2013 році і піднявся на 16-е місце в 2019 році, що свідчить про те, що туристична індустрія Китаю стрімко розвивається і стає все більш конкурентоспроможною. Через вплив пандемії доходи від туризму значно знизилися. За підсумками 2021 року загальна кількість і доходи туристів на внутрішньому туристичному ринку Китаю дещо відновилися в порівнянні з 2020 роком, але все ще зберігали великий розрив з рівнем 2019 року. Дохід від внутрішнього туризму (загальне споживання туризму) Китаю становив 2,92 трлн юанів у 2021 році, збільшившись на 0,69 трлн юанів або на 31,0% порівняно з аналогічним періодом попереднього року (відновившись до 51,0% у 2019 році), згідно зі статистичними результатами вибіркового обстеження внутрішнього туризму, опублікованим Міністерством культури та туризму. З цієї цифри споживання міського туризму досягло 2,36 трильйона юанів, збільшившись на 31,6 відсотка; Споживання туризму сільськими жителями склало 0,55 трильйона юанів, збільшившись на 28,4 відсотка. Особливості розвитку туристичної індустрії Китаю в умовах епідемії такі: периферійний туризм продовжує залишатися гарячим, міський туризм і сільський туризм стали одними з гарячих точок туризму, нічний культурний туризм став новою точкою зростання, а онлайн-туризм інтегрується.

В роботі проаналізовано перспективи розвитку туристичної сфери України на найближчу повоєнну перспективу. Очевидно, що розвиток галузі прямо залежить від того, як швидко Україна здобудемо перемогу у війні з Росією. Очікується, що іноземні туристи виявлятимуть зацікавленість у візитах до України, щоб відвідати містах, що вистояли попри постійні обстріли та ракетні атаки. По-друге, багато українців, які зараз не мають змоги повноцінно відпочити чи вважають це недоцільним, захочуть відновитися й перезавантажитися разом зі своїми родинами. Так одночасно розвиватиметься і внутрішній, і зовнішній туризм.

Якщо ж війна затягнеться, то українські оператори ще більше

виходитимуть на європейський ринок, відкриватимуть свої філії на півдні України, щоб туристи мали змогу швидко вилітати на відпочинок одразу з Кишинева, Варшави чи Жешува.

Нами було проведено порівняння туристичної галузі Китаю та України, проаналізовано переваги та недоліки туристичної галузі двох країн, а також об'єднано власний практичний досвід для вивчення досвіду розвитку інших країн, а також запропоновано та використано більш доцільні контрзаходи та пропозиції щодо розвитку туризму.

У першому розділі дисертації в основному розглядаються теоретико-методологічні засади управління туризмом. Проаналізовано понятійно-категоріальний апарат, що стосується предмету дослідження. Визначено ключові характеристики сфери застосування туристичної галузі. В процесі глибинного аналізу обґрунтовані методичні підходи та показники оцінки ефективності туристичної діяльності. Для ілюстрації методу оцінювання та розподілу результатів наведено приклад 31 провінції Китаю. Розглядається велика кількість даних для порівняння передового досвіду різних країн, особливо з розвиненою туристичною галуззю.

У другому розділі систематично викладається стан розвитку туристичного менеджменту. На прикладах продемонстровано особливості розвитку туристичного менеджменту в Китаї та довоєнний стан туризму в Україні. Порівнюється конкурентна сила розвитку туризму між Китаєм та Україною. У першому розділі цієї глави проаналізовано особливості розвитку організаційно-економічних засад туристичного менеджменту в Китаї. У другому розділі цієї глави досліджується сучасний стан українського туризму та порівнюється розвиток Китаю та України з теорією конкурентоспроможності. У третьому розділі цієї глави відповідно вказується на особливості розвитку менеджменту туризму в майбутньому, включаючи поточне екологічне середовище, соціальне середовище, економічне середовище, технічне середовище тощо.

У третьому розділі запропоновано організаційно-економічний механізм

розвитку туристичної індустрії, організаційно-інноваційний шлях та економічну основу. Планування і управління екологічного туризму дозволяє в повній мірі враховувати теорію регіонального економічного розвитку, теоретичний метод екологічної економії, а також регіональний комплексний метод дослідження географії, здійснювати «внутрішньогалузевий контроль і позагалузевий розвиток», а також координувати вирішення протиріччя між економічною ефективністю та екологічною безпекою дестинацій екотуризму. Нами всебічно проаналізовано механізм управління туристичною галуззю на основі електронної комерції, включаючи туристичну електронну комерцію та її туристичну платформу електронної комерції. У другому розділі цієї глави на основі поглиблення розуміння структури та функцій еко економічної системи туристичної дестинації побудовано системне дослідження ринку туристичних послуг на основі комп'ютерних технологій.

Значна частина досліджень присвячена торгівлі туристичними послугами власної країни в умовах глобальної конкурентоспроможності. Однак рідко можна порівнювати міжнародну конкурентоспроможність торгівлі туристичними послугами нашої країни з конкурентоспроможністю інших країн. Зокрема, порівнювати конкурентоспроможність торгівлі туристичними послугами між Китаєм та Україною. Тому в даній роботі проведено порівняльне дослідження міжнародної конкурентоспроможності торгівлі туристичними послугами між Китаєм та Україною, а також проведено диференціацію відповідних даних двох країн для отримання існуючих проблем та тенденцій розвитку торгівлі туристичними послугами між Китаєм та Україною. У статті використано показники міжнародної торгівлі послугами; Частка міжнародного ринку, індекс міжнародних конкурентних переваг (ТК) та виявлений індекс порівняльних переваг (RCA) використовуються для порівняння та дослідження конкурентоспроможності торгівлі туристичними послугами між двома країнами, всебічного вивчення торгівлі туристичними послугами між двома країнами, а також аналізу існуючих переваг та проблем торгівлі послугами між двома країнами. Крім того, в роботі поєднано

кількісний аналіз з якісним аналізом, щоб сприяти розвитку туризму досліджуваних країн. У роботі можна прослідувати практичні методи та політику торгівлі послугами в умовах реалізації моделі організаційно-економічного розвитку туризму.

Ключові слова: туризм, управління, екотуризм, організаційно-економічні засади, конкурентоспроможність, сталий розвиток, туристична послуга, індустрія гостинності, Україна, Китай.

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5. **Lianfeng, Z.**, Danko, Y., Wang, J., & Chen, Z. (2021). Empirical Analysis of the Relationship Between the Development of China's Tourism Industry and Economic Growth Based on VAR Model. *International Journal of Financial Research*, *12*(4).

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analysis from Chinese data. *International Journal of Innovation, Creativity and Change*,15(5),849-869.

7. **Lianfeng**, Z., Danko Y. (2022). Comparative study on the competitiveness of Tourism industry between China and Ukraine. *IAR Journal of Humanities and Social Science*, 3(3),49-52.

8. **Lianfeng**, Z., Danko Y. (2019). Research on the application of mobile e-commerce in ecotourism. *Proceedings of the international scientific and practical conference "Economic and social development of Ukraine in the XXI century: the national vision and the challenges of globalization» (April 9 – 10, 2019, Ternopil).*

9. **Lianfeng**, Z., Danko Y. (2019). Evaluation of tourism resource based on users' satisfaction. *Proceedings of the scientific and practical conference of teachers, graduate students and students of the Sumy National Agrarian University (November 17-19, 2019, Sumy).*

10. **Lianfeng**, Z., Danko Y. (2019). The application of analytic hierarchy process in the evaluation of eco-tourism resources. *Proceedings of the scientific and practical conference "Development of the country's economic system in the context of international cooperation" (September 10, 2019, Uzhorod).*

CONTENT

INTRODUCTION

The actuality of the research topic. In the rapid development of the global economy, the tourism industry has become one of the industries with the strongest momentum and largest scale, driving economic growth in various countries. As an important component of the tertiary industry, it is increasingly valued worldwide. Countries are actively developing their own domestic and international tourism resources and developing their own tourism industries. As one of the important tourism markets, China faces the investment competition from international investment institutions and the pressure from other countries to attract and disperse domestic tourists, making the competition challenging. Therefore, China must first clarify the current situation of its tourism's international competitiveness, and then address its shortcomings comprehensively to upgrade China’s tourism from of quantity to one of quality.

In the context of economic globalization, the globalization of tourism has not only brought severe challenges and impacts to China's tourism industry but also provided good opportunities and prospects. Tourism consumption is a high-end form of consumption in modern society that can effectively combine material and cultural consumption. The tourism industry is an important part of the tertiary industry, with advantages such as low investment, high returns, and low pollution, earning it titles such as "smokeless industry" and "invisible trade." In recent years, China's tourism industry has developed rapidly and has become an important industry and new economic growth point in the national economy. With the deepening of free trade, the position of service trade in foreign trade development is becoming increasingly prominent. Inbound and outbound tourism, as the most important part of service trade, has become an important weapon for countries to participate in competition. Overall, China's tourism is relatively large in size, and the number of inbound tourists and foreign exchange earnings have been increasing year by year. However, since 2010, China's tourism inbound and outbound balance has been showing a

deficit, and this deficit has been gradually expanding in recent years. Although China has rich tourism resources, its overall competitiveness in tourism service trade is not that strong. In order to reverse the current situation of deficit and improve competitiveness, how to improve the international competitiveness of China's tourism industry is currently a hot topic being deeply researched in theory field of China's tourism.

This research is dedicated to the international competitiveness of China's tourism industry. Firstly, the status of China's tourism industry is described from aspects such as the overall scale of development, inbound and outbound tourism, foreign exchange income, and the development of related industries. An analysis is conducted on the advantages and disadvantages of China's participation in international tourism competition. Secondly, the competition of China's tourism in the international market is calculated through various indicators, such as the Trade Competitiveness Index, the Revealed Comparative Advantage Index, and the International Market Share. A comparison is made with Germany, Japan, Spain, the United States, Thailand, and Ukraine, and the conclusion is drawn that China's international competitiveness in tourism is weak. Lastly, based on Porter's Diamond Model, a qualitative analysis is conducted on the influencing factors such as production factors, demands, related industries, and enterprise strategies. The Revealed Comparative Advantage Index (RCA) is selected as the dependent variable, and variables such as the number of tourist attractions, the number of students in tourism colleges, tourism expenditure in China, the number of hotels, railway and flight routes, the number of travel agencies, funding support for tourism enterprise development, and e-commerce technology are chosen as explanatory variables. A model is established for quantitative analysis.

The purpose of this research is to provide suggestions and countermeasures for enhancing China's international competitiveness in the tourism industry from the perspectives of the government, industry, and enterprises by analyzing the status and competitiveness of China's tourism industry and the factors that affect its competitiveness through qualitative and quantitative analysis.

Connection of work with scientific programs, plans, and research topics: The dissertation research was conducted within the framework of the scientific research plan of the Department of Marketing and Logistics of the Sumy National Agrarian University «Management of the competitiveness of enterprises on the basis of innovative marketing» (0119U100250). Within the framework of the scientific topic, the features of the functioning of tourism in Ukraine and China were studied, the geographical structure of tourist flows to the countries was analyzed, the main factors contributing to the development of the market of tourism services were identified. Some of the research is carried out within the project "Research on the ecological efficiency of tourism under the background of rural revitalization" (2021-ZDJH-0032), funded by the Henan humanities and social sciences studies; "Research on spatial differentiation of the development level of homestays in Henan Province and its promotion strategies" (SKL-2022-466), funded by the Henan Provincial Federation of Social Sciences; “Research on the teaching reform of a research-based e-commerce course based on the CDIO concept”(2022SYJXLX073), funded by teaching research project launched by Henan Provincial Department of Education.

The aim and objectives of the study. *Aim of the research* is the development of theoretical, methodical, and applied principles of organizational and economic basis of tourism management.

Research tasks that were considered:

- introduce the research background, significance, theoretical achievement, research content, research methods, and possible novelty and limitations.

- define the concepts of tourism industry, international competitiveness, and international competitiveness of tourism, and then analyze the theory of comparative advantage, factor endowment theory, and competitive advantage theory, laying the theoretical foundation for the subsequent research.

- describe the status of the tourism industry from the perspectives of development stage, trade scale, inbound and outbound situations, and related industrial development, and make judgments on China's current inbound and

outbound tourism.

- measure the international competitiveness of China's tourism through indicators such as market share, revealed comparative advantage index, and trade competitiveness index, and judge the development level of China's international competitiveness of tourism and the gap with other countries' tourism.

- qualitatively analyze the factors influencing the international competitiveness of China's tourism industry, then select the dependent and independent variables to establish a regression model to quantitatively analyze the influencing factors.

- based on the research findings, provide suggestions for improving China's international competitiveness in tourism.

Research methods. The aim and task of the research is achieved using a system of general scientific and special methods. *Literature research method* - consulting a large number of literature data, sorting out the researchers at home and abroad a large number of research results, and these data are further induction, arrangement and classification, outlines the research achievements in the field of research, research scope, and in the process of research, The vital value of this research in theory and practice is systematically analyzed, and the starting point of this research is put forward. *Dynamic analysis and static analysis method* of combining - discusses travel efficiency, no matter from the angle of theory, or from the perspective of empirical research to analyze, belonging to a dynamic development process. The study of the dynamic development process must be based on the skillful static surface at different time points, so that the most accurate dynamic analysis results can be obtained in the static analysis process to form a precise interpretation of the interrelations between various elements in the process of tourism transformation. *A combination of quantitative and qualitative analysis* - quantitative research is adopted for all efficiency evaluation and comparative analysis of competitiveness. In contrast qualitative research is applied to the analysis process where accurate data cannot be obtained or quantification is difficult. *Comparative research methods* - problems of tourism transformation, we should not

only sum up the general rules of the transformation, but also point out the unique points in the tourism development process between Ukraine and China. The most significant advantage of this method is that it can guarantee the regularity and particularity of the research results, which will significantly improve the scientific and practical value of the research results. *Through fuzzy evaluation and analysis*, it is suggested that cities with good tourism resources should be improved in-depth development of the existing landscape, coordination and integration of tourism resources, the perfection of tourism support and security system, and combine the characteristics of tourism resources in tourism development. *Analytic Hierarchy Process (AHP)* is a complicated multi-objective decision-making problem as a system, the target is decomposed into multiple objectives or principles, or rules, constraints, and multiple indexes of several levels, through qualitative index fuzzy quantification method to calculate single hierarchical sort (weight) and total ordering, as the target (index), scheme optimization decision method of the system.

The scientific novelty of the obtained results. The most important scientific results that contain scientific novelty are:

the results obtained for the first time:

- based on the vector autoregression of the time series data of tourism development, it is found that there is a long-term equilibrium relationship between China's tourism foreign exchange income and domestic tourism gross income and their respective GDP, and the long-term effect is 99% respectively. Through the establishment of the VAR model for the development of China's tourism industry and economic growth, in the long run, we build a balanced relationship of mutual promotion, to further guide the development of China's tourism;

there improved

- visualized cartographic analysis carried out from perspectives such as country/region distribution, institution distribution, journal distribution, keyword co-occurrence, splash theme and highly cited literature, etc., which made it possible to determine the state of development of this industry over the past 15 years, identify

its research hotspots and boundaries, and provide a reference point for ecotourism research;

- based on the theory of marketing, constructs the brand marketing theory system of tourism destination based on the overall interests of the region and introduces the brand marketing of tourism destination in Ukraine as a case study, starting from the status quo of tourism brand marketing in Ukraine;

there developed:

- the application of mobile e-commerce in ecotourism is investigated and evaluated with PEST analysis method through the analysis of specific application mode of mobile e-commerce in ecotourism and it concludes that tourism is the most suitable product for mobile e-commerce, and the combination of the two can better promote the development of ecotourism and improve economic benefits;
- understanding the status quo of import and export trade of the tourism industry in China and Ukraine by sizing a specific index to analyze the difference between the two countries of the tourism industry of international competitiveness;
- the priority steps of reforming the tourism industry in Ukraine are identified, which provide for state support, improvement and expansion of the range of tourism services, introduction of modern technologies, adoption of best practices of other countries, which can become an effective tool for spreading Ukrainian culture, economic growth in the country, increasing the interest of foreign investors and stimulating cooperation in international projects, in particular, the initiative "One Belt, One Road".

The practical significance of the obtained results consists in their further use by travel agencies, higher educational institutions, and management bodies in the field of tourism at various levels. Then the proposed practical and methodological recommendations are implemented in the activities of Sumy National Agrarian University and Henan Institute of Science and Technology. Employees of promotion departments use them to establish a system of communication with key stakeholders.

Personal contribution of the applicant. The Ph.D. student has searched and analyzed literature sources on the topic of the work, selected methods and techniques, experimental and laboratory research, statistical processing, and analysis of the results. Interpreter and generalize the obtained results, draw the dissertation's conclusions, and make practical recommendations under the supervisor's guidance.

Approbation of dissertation results. The main provisions and results of the research were reported and received general scientific approval at the annual scientific reports and conferences of faculty and graduate students at Sumy National Agrarian University (Sumy, Ukraine, 2018-2021); International scientific and practical conference “Economic and social development of Ukraine in the XXI century: the national vision and the challenges of globalization» (April 9 – 10, 2019, Ternopil); Scientific and practical conference "Development of the country's economic system in the context of international cooperation" (September 10, 2019, Uzhorod)

Publications. The main results of scientific research were published in 10 scientific articles: 3 articles in specialized publications of Ukraine, 1 article in journals included in the scient metric databases Scopus, the rest - in other journals and conference proceedings.

Structure and scope. The dissertation consists of an introduction, three chapters, conclusions, a list of references and appendices. The total volume of work is 215 pages. The work contains 24 tables and 49 figures. The references consist 223 publications.

1 THEORETICAL AND METHODOLOGICAL BASIS OF TOURISM MANAGEMENT

1.1 Main classification concepts of tourism management

To accurately define the essence of tourism, this section elaborates on the tourism industry, tourism management, tourism services, and tourism competitiveness.

The concept of tourism is broad, and in a narrow sense, in China it mainly refers to tourism enterprises such as travel agencies, hotels, transportation companies specializing in tourism, and those engaged in tourism commodity trading. In a broader sense, it includes all industries related to tourism, in addition to specialized tourism sectors. As a new and advanced form of consumption, tourism activities often combine material and cultural consumption. Due to the diversity of tourism demands, the supply of tourism activities is very complex, and the industry can be divided into different types from the perspective of supply, including accommodation, catering, transportation, and other industrial elements. The tourism industry is a comprehensive industry that relies on tourism resources and facilities, specifically or mainly attracting and receiving tourists and providing transportation, sightseeing, accommodation, catering, shopping, and entertainment services.

The tourism industry consists of three pillars: tourism, transportation, and accommodation represented by hotels. The tourism industry has become an important source of income for many regions and even entire countries. In 1980, the "Manila Declaration on World Tourism" recognized the importance of tourism, stating that it is "an activity of vital importance to the life of nations because of its direct effects on the social, cultural, educational, and economic sectors of societies and on their international relations." Tourism also brings certain income to the local residents, improving their quality of life[1]. By providing goods and services that tourists need, the tourism industry brings in a lot of income for the local economy. According to the World Tourism Organization (UNWTO), as of 2019, the industry accounted for 40% of the world's service trade and 16% of the total exports of goods and services[2]. It also creates employment opportunities for economic service

sectors related to tourism. The tourism industry is an industry chain, which includes reception services (such as accommodation, including hotels and resorts), transportation services (such as airlines, cruises, trains, and taxis), entertainment places (such as amusement parks, restaurants, casinos, shopping centers, concert venues, and theaters) and souvenirs[3]. Currently, the application of information technology in the tourism industry is changing traditional reception modes. Companies use e-commerce platforms to provide consulting services, ticketing processing, design and promote tourism products. With the rapid development and popularization of the Internet worldwide, e-commerce as a new business model is also entering various fields of traditional business, including the tourism industry[4-6].

In addition, because the tourism industry is a constantly developing "fashion industry", with new demands and new forms of tourism constantly emerging, such as industrial tourism[7], space tourism, and sports tourism, the scope of tourism is constantly expanding. If a fixed framework is used to divide the tourism industry, it will artificially broaden or narrow the role of tourism, leading to misleading accounting, research, and management of the tourism and its economy. The tourism industry is an industry that relies on tourism resources and facilities to provide sightseeing services to tourists. It is also known as smokeless industry or intangible trade. Sightseeing activities are a new and advanced form of consumption that often combines material and cultural consumption. In a broad sense, the tourism industry includes all industries related to tourism, in addition to departments that specialize in tourism services. Internationally, it is called the tourism industry, which is a comprehensive industry that mainly caters to tourists, providing transportation, sightseeing, accommodation, catering, shopping, and entertainment services based on tourism resources and facilities. Tourism has become a human need and is in line with development trends.

Tourism management

Tourism management refers to the planning, organizing, regulating, and supervising of tourism activities. It includes setting goals for tourism management,

establishing tourism information systems, developing tourism forecasting and decision-making, creating plans for tourism industry development, and monitoring the progress of tourism industry development. As shown in figure 1.1.

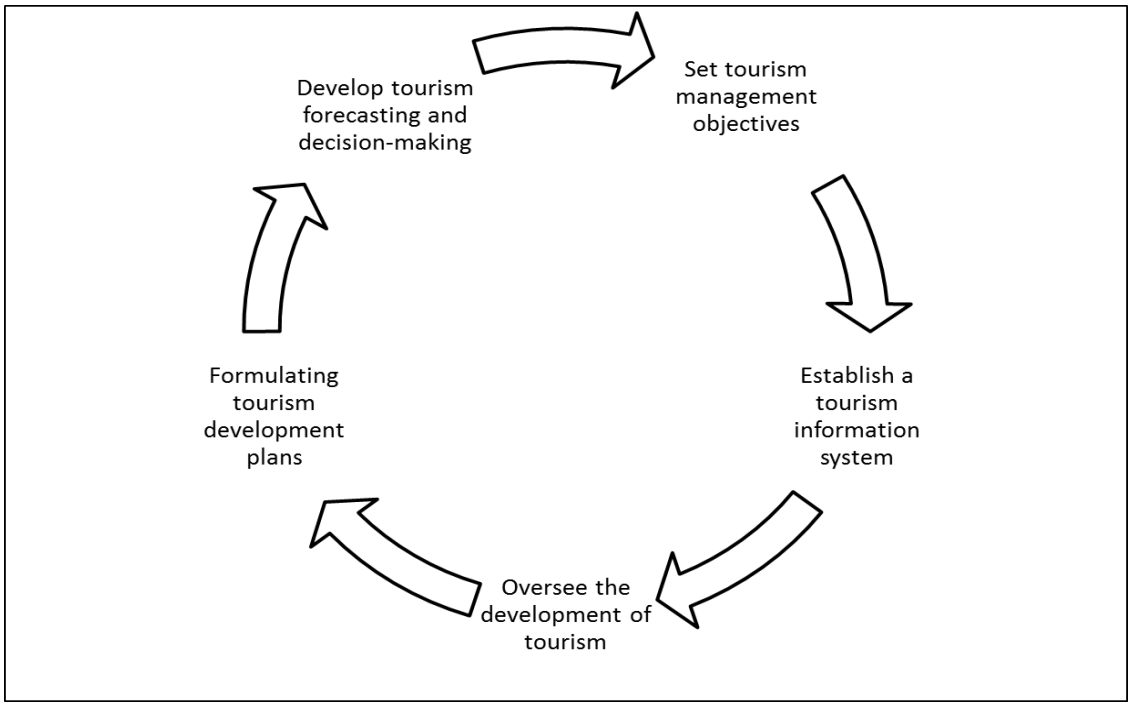

Figure 1.1 Tourism management process

Source: author´s development

Its content includes human resource management, material resource management, financial resource management, technology management, etc. It refers to the management of the entire tourism activity or tourism system. This means that people consciously and purposefully plan, organize, lead, coordinate, and control tourism activities or the operation of the tourism system to ensure the smooth and effective implementation of tourism activities and tourism management. Its main tasks include organizing tourism activities reasonably, constantly improving tourism production relations, fully mobilizing the enthusiasm and initiative of tourists, comprehensively improving the economic, social, and environmental benefits of tourism enterprises and the tourism industry, and promoting sustainable and healthy development of the tourism economy [8, 9].

Tourism activities refer to the various services provided to tourists during the reception, mainly including transportation services, tour guide services,

accommodation services, organizational management. Through tourism service, tourism resources and facilities become objects that people can enjoy and consume, thereby creating a special use value that satisfies people's needs. Foreign trade of tourism refers to the process in which tourism activities flow and exchange between countries for payment, that is, the process in which countries provide tourism transactions for international tourists to conduct international tourism activities. International tourism refers to tourism activities in which people leave their country of residence for a specific purpose, travel to other countries and stay briefly, and the purpose is not to obtain economic benefits from the visited place. International tourism includes not only outbound tourism from residents to other countries but also inbound tourism from residents of other countries. Tourism services are provided directly to tourists to meet their diverse needs for catering, accommodation, transportation, sightseeing, shopping, entertainment. They can be divided into several types as shown in figure 1.2 [10].

Figure 1.2 Tourism Industry Activity

Source: author' s development

(1) Travel agency services refer to tourism companies that specialize in receiving domestic and foreign tourists and organizing tourism activities. Travel agencies are responsible for designing, combining, and marketing tourism products, as well as providing specialized services such as information consultation and

organizing tourism activities.

(2) Accommodation and catering services are basic needs for tourists and an important component of tourism products. The number, scale, service, hygiene conditions, and management level of hotels not only represent the size of its reception capacity, but also reflect the quality and level of its tourism services.

(3) Sightseeing services are not only the fundamental element of tourism activities but also the core content of the tourism industry. With the development of modern tourism, whether it is pure eco-tourism, cultural tourism, or tourism activities based on business and festivals, it requires providing corresponding sightseeing services. Therefore, sightseeing services are an important content for the development of tourism industry.

(4) Transportation services are the foundation and prerequisite for the spatial mobility of tourists, and there can be no developed tourism industry without a developed transportation service.

(5) Entertainment services provide leisure-oriented sightseeing, vacation, and entertainment activities, and they are an important component of modern tourism. With the development of modernization, demands of these activities are increasing, which requires providing various high-tech entertainment and facilities to meet people's needs.

(6) Shopping services help tourists to purchase various crafts, souvenirs, replicas of cultural relics, and local products of the tourist destination, and they are also an important content of modern tourism services.

From a spatial perspective, industrial competitiveness can be divided into international competitiveness and domestic competitiveness. The World Economic Forum defines international competitiveness as a country or company's ability to produce more wealth than its competitors in the global market[11]. In the study of international competitiveness, Jin pointed out that the basic meaning of international competitiveness is the productivity reflected by a specific industry in a country through the sale of its products in the international market. Archibald, X. Lacorbiniere, J. Moore, W. used a dynamic tourism gravity model to evaluate the

competitiveness of regional tourist destinations[12]. Porter proposed the "Diamond Model" in his book "The Competitive Advantage of Nations", which combines international competitiveness and industry, and proposes that whether a specific industry has international competitiveness depends on six factors, including the basic factors of production factors, demand conditions, related and supporting industries, enterprise strategy, structure and competition, as well as the assisting factors of government and opportunities[13, 14]. There is no accurate concept of international competitiveness for the tourism industry internationally. Combining the relevant definitions of the tourism industry and international competitiveness, it can be understood as the ability of a country or region's tourism service providers to provide tourism products and related services to foreign consumers based on their own resources and to make profits in the market under the environment of trade liberalization[15].

According to the definitions provided by authoritative international organizations and scholars, the understanding of the international competitiveness of the tourism industry is generally consistent. This study adopts the definition by Jin and defines the international competitiveness of the tourism industry as the productivity of a country's tourism industry reflected by the sales of its products in the international market, which is mainly influenced by six factors. This productivity cannot be represented by physical objects, and according to the definition, this production is productivity that satisfies the demand of the international market, which means that the size of this productivity can be reflected by the market sales volume[16-18]. In economics, the international competitiveness of an industry is usually evaluated using five indicators: market share (MS), international market share (IMS), revealed comparative advantage (RCA), trade competitiveness (TC), and comparative advantage (CA)[19-21]. This study focuses on analyzing the international competitiveness of China's tourism industry and considering data availability, selects the commonly used IMS, TC, RCA, and VRCA indicators for evaluation[22-25].

Due to the diversity of tourism demand, the supply of tourism activities is very

complicated, which makes it relatively challenging to divide industries from the perspective of supply. It does not conform to the actual situation of tourism activities, and it cannot form a clear and complete industrial concept. For example, industrial elements such as accommodation, catering, and transportation can be classified as tourism and other industries. In addition, as tourism itself is a constantly developing "fashion industry," with the influx of new demands and formats, it is absorbed into the category of tourism-by-tourism activities, such as industrial tourism and space tourism, which continuously expands the boundary of tourism. If using a fixed framework to divide the tourism industry is not in line with reality, it will artificially broaden or narrow the role of tourism, making the accounting, research, and management of the tourism industry and tourism economy misleading.

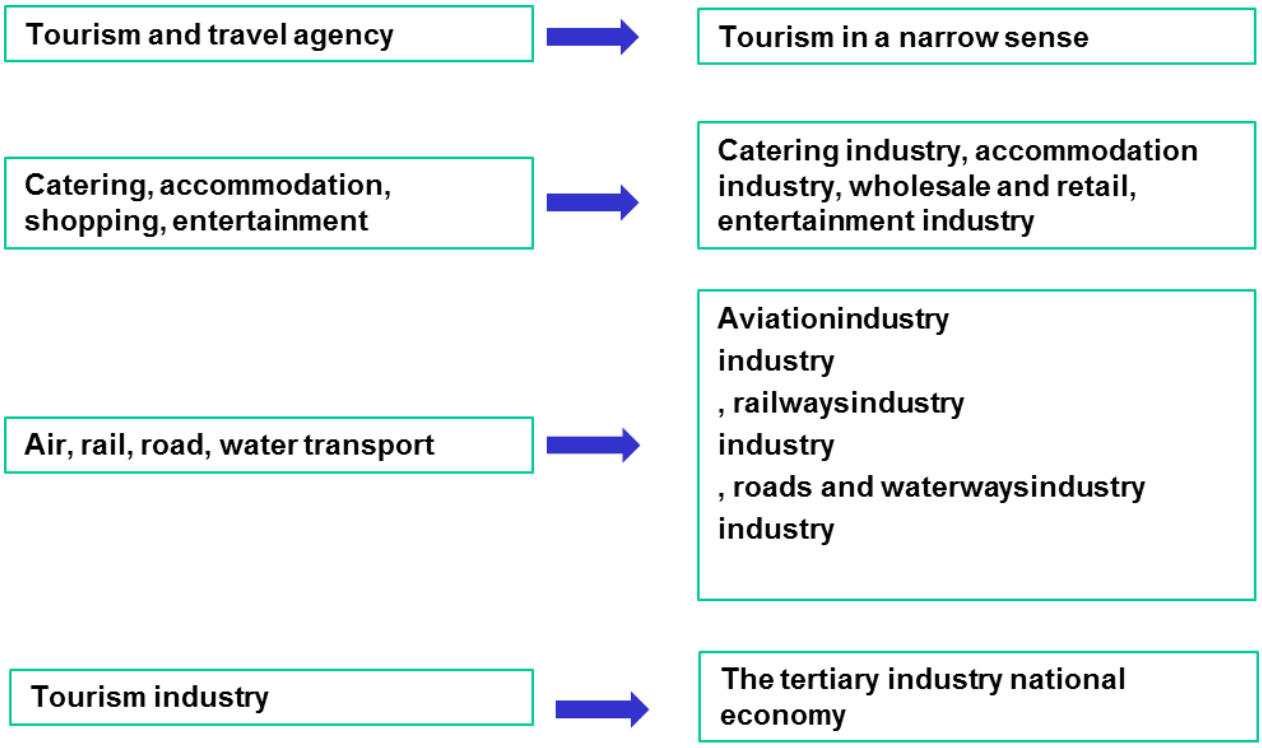

Figure 1.3 – Main touristic category

Tourism, internationally known as the tourism industry, is a comprehensive industry that specializes or mainly engages in attracting and receiving tourists, providing transportation, sightseeing, accommodation, catering, shopping, entertainment, and other six links by relying on tourism resources and facilities. The tourism business is comprising three parts: the tourism industry, the transportation

industry, and the accommodation industry represented by hotels. They are the three pillars of tourism. In the narrow sense, tourism in China mainly refers to travel agencies, tourist hotels, tourist bus and ship companies, and tourism businesses specializing in the trading of tourist commodities. Tourism, in a broad sense, includes all walks of life -related to tourism in addition to the sectors specializing in tourism. As a new and advanced form of social consumption, travel and sightseeing activities often combine material life consumption and cultural life consumption organically.

Tourism enjoys an important position in social and economic activities and has become the main force of economic growth because of its strong development momentum. Tourism, with its story and outstanding contributions to related industries, has become a strategic pillar industry of the national economy. China integrates natural landscape, cultural landscape, and ecological agricultural and industrial landscape, and has excellent potential for tourism development. In the era of change, the development of the tourism industry is facing all kinds of challenges, and the management thought of the tourism industry is changing from process management to strategic management. Only by making a forward-looking grasp of this trend, can we be in a favorable position in the competition. Creating value chains is the process of creating value, combining product development and marketing(El-Naggar et al., 2022). Therefore, it is instructive to use the value chain theory to analyze the industrial strategy. It is an essential application of value chain theory in the development of the tourism industry to study the effect of the regional tourism industry from a new perspective of value chain management and to construct a development strategy system for obtaining competitive advantages.

The idea of customer perception theory was first put forward by Drucker, pointing out that what customers buy and consume is not products but value. 1988 customer perception theory is at a low price to pay, to obtain more interests, emphasizes the trade-off between the price paid and the benefits received. Michael porter in the 1995 book "competitive advantage", puts forward the concept of "the buyer of the value chain", and points out that the value of the enterprise for the buyer

to create the premium if you want to return, It must be perceived by the buyer. Although the specific concept is not given, it provides a theoretical basis for future research. Woodruff in the 1997 pointed out that perceived value is a customer for a particular use situation, help to achieve its goal of a product or service attributes, actual effect and the perceptual preferences and assessment of the results, at the same time, the customer at the judgment and evaluation takes into account the other competitors' products and services that value is relative to the purchase price of the customer perceived utility, And in the economy, technology, service and social benefits and many other aspects reflected. Philip Kotler defined customer perceived value as: Customer perceived price refers to the difference between all the values and costs of a supply and perceived value estimated by customers, which should be analyzed from the perspectives of product value, service value, employee value and image value. Some Chinese scholars have also given similar definitions based on the research of customer perception theory by foreign scholars, the most representative of which is Professor Bai Changhong. The perceived value proposed by Professor Bai is the overall evaluation of the effectiveness of products or services by customers based on their income and efforts(Michailidou, Vlachokostas, & Moussiopoulos, 2015). It is an essential prerequisite for determining customer satisfaction and provides a new understanding and management basis for enterprises to truly realize customer satisfaction. Fan Xiucheng and Luo Haicheng also gave a comprehensive definition of the concept of customer perceived value: customer perceived value equals functional value, emotional value and social value. In short, customer perceived value differs from customer value. The cognitive subject of the former is the customer, that is, the overall judgment and evaluation of the value of the product or service by the customer. In contrast the cognitive subject of the latter is the enterprise, that is, the value that the product or service provided by the enterprise can create for the customer(Pert et al., 2015). Therefore, to create "customer perceived value theory" is to design a series of marketing strategies from the perspective of customers rather than from the perspective of the enterprise itself, which is conducive to the realization of customers' value, to achieve a win-win

situation between the company and customers. ("General Practice and the Community: Research on health service, quality improvements and training. Selected abstracts from the EGPRN Meeting in Vigo, Spain, 17-20 October 2019 Abstracts," 2020).

Data Envelopment Analysis (DEA) was first proposed by American operational researchers Chames and Cooper based on "relative efficiency evaluation." It takes each evaluated object as a Decision-Making Units. DMU), through the comprehensive analysis of the input and output ratio, determines the effective production frontier, and at the same time, through the production frontier projection, get the reasons for the inefficiency and the direction and degree of improvement. Compared with traditional efficiency research methods, the DEA method has the following advantages: First, it does not need to construct production function and do parameter estimation; Secondly, there is no need for dimensionless conversion of input and output indicators, and no need to determine the weight of each indicator in advance, which can effectively avoid the influence of subjective factors and reduce errors. Finally, it can be used to compare the same type of decision-making units with multiple inputs and outputs. The above characteristics of the DEA method make it widely used in a short period. The current application in tourism includes the technical efficiency, operational efficiency and ecological efficiency of tourism enterprises, the sustainable development of tourism and the quality of tourism service.

The regression analysis method refers to an analysis method that makes use of the data statistics principle to process many statistical data, determine the correlation between dependent variables and some independent variables, establish a regression equation with good correlation (function expression), and extrapolate it to predict the change of dependent variables in the future. The regression analysis of steps to edit speech.

The steps of regression analysis are as follows:

1. According to the existing data and relations of independent variables and dependent variables, preliminarily set regression equations;

2. Find a reasonable regression coefficient;

3. Conduct a correlation test to determine the correlation coefficient;

4. After meeting the correlation requirements, the future state of things can be determined by combining the obtained regression equation with specific conditions, and the confidence interval of predicted values can be calculated.

The main problems solved by regression analysis.

1. Determine whether there is a correlation between variables. If there is, find out the mathematical expression;

2. according to the value of one or more variables, predict or control the weight of another or more variables, and estimate the control or prediction can achieve what kind of accuracy.

Literature research method. Not only refer to a large number of literature databases, this paper also USES the network search tool, consulting a large number of literature data, sorting out the researchers at home and abroad a large number of research results, and these data are further induction, arrangement and classification, Outlines the research achievements in the field of research, research scope, and in the process of research, The vital value of this research in theory and practice is systematically analyzed, and the starting point of this research is put forward.

Dynamic analysis and static analysis method of combining. The travel efficiency index is a dynamic process. This article discusses travel efficiency, no matter from the Angle of theory, or from the perspective of empirical research to analyze, belonging to a dynamic development process. The study of the dynamic development process must be based on the skillful static surface at different time points, so that the most accurate dynamic analysis results can be obtained in the static analysis process to form a precise interpretation of the interrelations between various elements in the process of tourism transformation.

A combination of quantitative and qualitative analysis. In this study, quantitative research is adopted for all efficiency evaluation and comparative analysis of competitiveness. In contrast qualitative research is applied to the analysis process where accurate data cannot be obtained, or quantification is difficult.

Comparative research methods. To study the related problems of tourism transformation, we should not only sum up the general rules of the transformation, but also point out the unique points in the tourism development process between Ukraine and China. The most significant advantage of this method is that it can guarantee the regularity and particularity of the research results, which will significantly improve the scientific and practical value of the research results.

Fuzzy comprehensive evaluation method. The fuzzy comprehensive evaluation of tourists focuses on the two levels of "satisfaction" and "general", and the overall assessment is positive. Through the fuzzy thorough evaluation of tourists, some problems in the rapid development of tourism can be reflected: excessive commercialization driven by short-term profit, the endowment advantages of local resources cannot be fully reflected; "Soft links" such as service and management remain weak; Tourism support security system is not perfect; Lack of comprehensive coordination between scenic areas and so on. The "short board effect" caused by these problems affects the complete feeling of tourists, thus affecting the overall image of the world as a tourist city and becoming an important factor restricting the further development of urban tourism.

Through fuzzy evaluation and analysis, it is suggested that cities with good tourism resources should be improved in-depth development of the existing landscape, coordination and integration of tourism resources, the perfection of tourism support and security system, and combine the characteristics of tourism resources in tourism development.

Analytic Hierarchy Process (AHP) is a complicated multi-objective decision-making problem as a system, the target is decomposed into multiple objectives or principles, or rules, constraints, and multiple indexes of several levels, through qualitative index fuzzy quantification method to calculate single hierarchical sort (weight) and total ordering, as the target (index), scheme optimization decision method of the system. Analytic Hierarchy Process (AHP) is a decision-making problem according to the general objective, the Stratton goal, evaluation criteria and the order of the specific for the voting scheme are decomposed into different

hierarchies, and then, by solving the judgment matrix eigenvector calculated for each element of each level on a scale the priority weight of a component, then the method of weighted sum hierarchical merging various alternative solutions to the total target of the final weight, The one with the highest weight is the optimal scheme. The Analytic Hierarchy Process (AHP) is more suitable for the decision-making problem with the objective system with a staggered evaluation index and the target value is difficult to describe quantitatively.

In this part of the paper, the tourism development is sorted out. Firstly, the concept, primary attributes and classification of tourism and tourism management are defined. Define the scope of tourism in detail. The author thinks that tourism is not a divided industry, the scope is relatively broad, including not only entertainment, accommodation, shopping, but also tourism transportation and travel agencies and other related tourism enterprises. Then based on the concept, the relevant theories and methods of tourism research are explained.

1.2 Methodological basis for the evaluation of the effectiveness of tourism activities

To meet the specific needs of studying the international competitiveness of China's tourism industry and its influencing factors, comparative advantage theory, resource endowment theory, and international competitiveness theory are organized, providing a theoretical basis for subsequent analysis of China's international competitiveness in tourism industry and its influencing factors.

Comparative advantage theory was proposed by British classical economist David Ricardo. He believed that even if a country or region does not have an advantage in the production of two certain products, while another country or region has, if the two countries or regions trade according to the principle of "taking the lesser of two evils and taking the greater of two advantages", both sides can still benefit. Based on this, all countries can participate in international trade, and tourism

service trade is one of the largest sectors in which they can participate [26-29]. Each country's advantage is different, and different international divisions of labor are formed based on the different advantages, which also to some extent determines the size of competitiveness. Currently, China's comparative advantage in tourism service trade is mainly reflected in its rich and unique natural resources and relatively low labor costs. This comparative advantage is relatively basic and lacks sustainable development capability. With the passage of time and the development of science and technology, it is difficult for China to rely solely on natural and labor resources to produce competitive advantages. China should strive to change its export methods and develop export tourism brands, enterprise management, talent, and other aspects [30].

The Factor Endowment Theory, also known as the "Heckscher-Ohlin Theory" or "H-O Theory,"[31] is an international trade theory that explains differences in factor endowments among countries. This theory was developed by Swedish economist Ohlin, building upon the research of Swedish economist Heckscher. Ohlin believed that the relative differences in resource endowments and the intensity with which these factors are used in producing various goods form the basis of international trade. The theory emphasizes that producing different goods requires different factors of production, such as capital and land, in addition to labor. Different goods require different factor allocations. A country should export products produced by the factors of production that are relatively abundant in its own country and import products produced by factors of production that are relatively scarce in its own country. Furthermore, with the development of international trade, the prices of factors of production in different countries will tend to be equal. The differences in factor endowments among countries have a significant impact on their comparative advantages. In the context of tourism, China has many unique tourist resources, such as the Ming Tombs, the Forbidden City, and the Great Wall, which are ancient architectural marvels; the Danxia landform of Danxia Mountain, which is one of the world's first geological parks; the Forbidden City is one of the world's five great palaces; and Chinese opera culture was listed in

the United Nations Educational, Scientific and Cultural Organization's Representative List of the Intangible Cultural Heritage of Humanity in 2009. These unique tourism resources in China are important factors of its factor endowment and can greatly attract foreign tourists[32, 33].

The international competitiveness was proposed and studied by the World Economic Forum and the Lausanne International Development Institute. International competitiveness is usually divided into three levels, from macro to micro, namely national international competitiveness, industrial international competitiveness, and enterprise international competitiveness. National international competitiveness refers to a country's ability to produce more wealth in the world market than other countries in a balanced way. Industrial international competitiveness refers to the different competitiveness shown by a country's industry in terms of market share, production efficiency, and services compared to the same industry in other countries. Enterprise international competitiveness reflects the competitiveness of enterprises in terms of strategy, operation, and management.

Tourism competitiveness refers to the ability of tourism regions to obtain development factors, compete for market share, and achieve a certain profit in the tourism market competition through the interaction and combination of factors such as tourism production element conditions, tourism demand, tourism-related industries and supporting industries, and government actions and opportunities in order to achieve the sustainability of tourism industry development[34-36]. Michael Porter is one of the most famous scholars in the field of international competitiveness research. He is the first scholar to study international competitiveness from an industrial level, and he also breaks the traditional definition of industry by combining industry, country, and enterprise for analysis. He summarized the four elements that affect industrial international competitiveness and formed the "diamond model": production factors, demand factors, related and supporting industries, and enterprise strategic structure and competitors.

Michael Porter Diamond Model [13, 37, 38] is a theory proposed by Michael

Porter in 1990, a renowned strategic management expert from Harvard Business School. It is used to analyze how a country forms a competitive advantage in the international market. It is shown in Figure 1.3.

The diamond model is a new method for understanding the global competitive position of a country or region, and has become an indispensable part of international business thinking. Porter's viewpoint of "cluster", which consists of a group of interrelated businesses, suppliers, related industries, and specific regional organizational structures, has become a new way for businesses and governments to think about the economy, evaluate regional competitive advantages, and develop public policies.

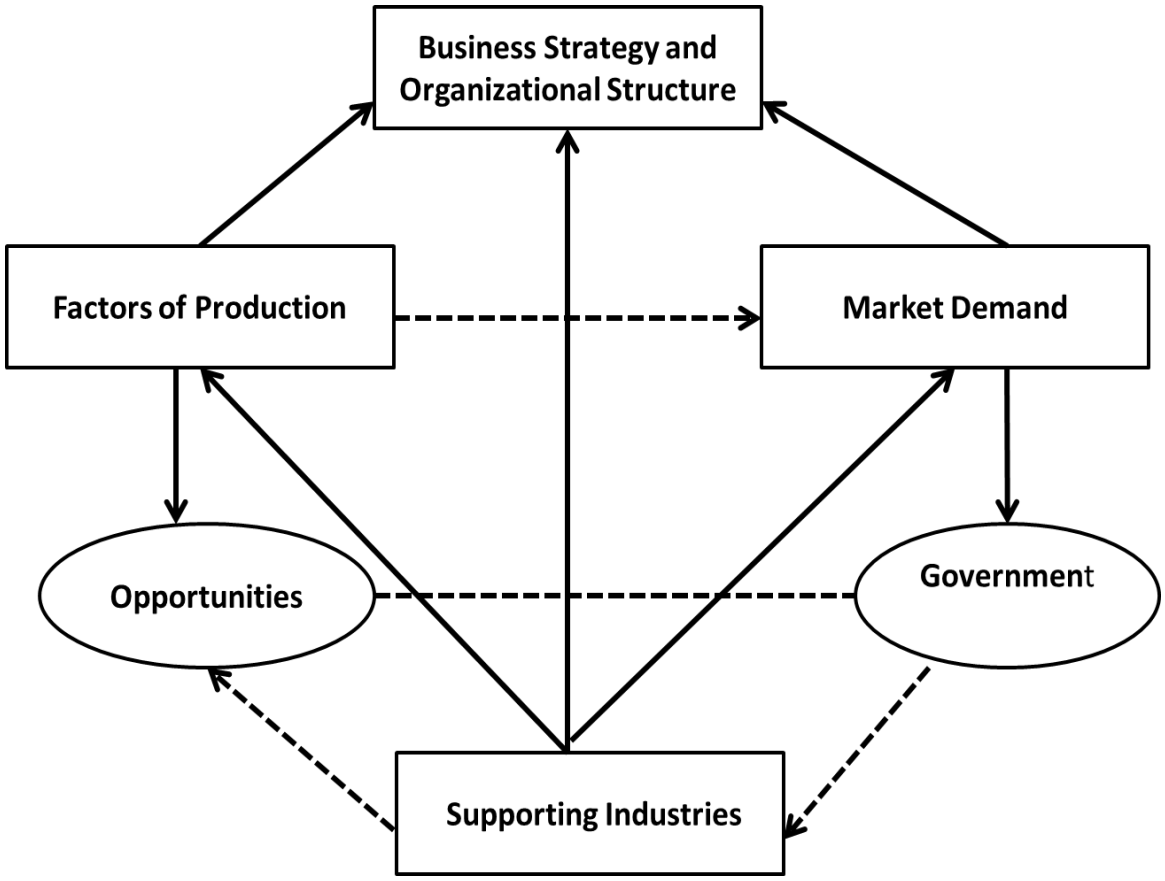

Figure 1.4 Porter's "Diamond" model

Source: [39]

The "diamond model" theory suggests that a country's competitiveness comes mainly from natural resources, labor factors, and capital factors, similar to the theory of comparative advantage. However, the difference is that a country's competitive advantage is the main source of its wealth. Porter points out that for a country or

industry to gain a competitive advantage in the global market, it must rely on the following four basic factors.

Production factors, which include both basic and advanced elements. Basic production factors are the most fundamental elements needed for production, while advanced factors, such as education levels of labor forces, knowledge and skills, and technological innovation, require long-term investment. Compared to basic factors, advanced factors can more effectively enhance a country's or industry's international competitiveness. Therefore, for countries that want to improve their international competitiveness, increasing cultivation of advanced factors is more effective[40, 41].

Demand conditions that closely related to the market. The supply and demand relationship affects a country's consumption level. The larger the domestic market demand, the more vigorous the demand for products, and the higher the consumption level. The increase in consumption level drives competition among manufacturers. A more efficient market is more likely to form economies of scale and benefit the operation of industries and countries. Therefore, stimulating domestic market demand is more conducive to enhancing a country's international competitiveness [42-44].

The development of related industries. The development of an industry can drives the development of upstream and downstream industries and form an industrial cluster effect that can reduce transaction costs, improve innovation, accelerate the improvement of production efficiency, and form a complete industrial chain [45-47].

The strategy, structure, and competition of enterprises. The strategy adopted by an enterprise directly affects its development path. Good management and organizational models can improve the enterprise's competitiveness. An increase in the number of domestic enterprises can create intense competition and stimulate enterprises to continuously innovate and progress in order to maintain a sustainable competitive advantage [48].

Apart from the four basic elements mentioned above, Porter also pointed out that the two auxiliary elements, opportunity, and government, can better help a

country form a competitive advantage. Opportunities such as hosting international events with high public attention, such as the Beijing Winter Olympics, can help a country improve its image and stimulate the development of the domestic economy. As for government, it needs to create a favorable environment that can improve the productivity. This means that the government should try not to intervene in the market in some aspects such as trade barriers and pricing, but should actively intervene in other aspects such as providing high-quality education and training.

Regarding the development of international competitiveness, Porter divided it into four specific stages:

The first stage is driven by factors, which relies on the country's resources and cheap labor. The competitive advantage of enterprises lies in resource monopoly and price competition; for tourism enterprises, they need to fully develop existing tourism resources and meet the needs of different tourists.

The second stage is driven by investment, where enterprises expand their production capacity on a large scale and the government plays a leading role. Through a large amount of investment, enterprises form economies of scale and industrial clusters, and promote the primary factors that form competitive advantages to a higher level. For example, supporting chain hotels, resorts.

The third stage is driven by innovation, where the government should reduce intervention and let enterprises engage in innovation. Enterprises acquire higher skill levels through research and development, gain cost advantages after obtaining production technology. Besides, they should actively promote the application of information technology in the tourism industry to innovate the development of the tourism industry.

The fourth stage is motivated by wealth, where society is already very affluent, and more emphasis is placed on fairness. The formation of competitive advantages depends on the establishment and innovation of new industries and the promotion of wealth. Driven by wealth, a one-stop service for tourism enterprises is formed.

The theory of sustainable development refers to the effect that meets the needs of the present generation without endangering the ability of future generations to

meet their needs. It takes equity, sustainability, and commonality as three basic principles. The goal of sustainable development theory is to achieve joint, coordinated, fair, efficient and multi-dimensional development.

The theoretical basis of sustainable tourism development theory is as follows: The first is the basis of economic theory. The limits to growth theory is a sustainable development theory proposed by D.H.Meadows. The theory integrates the material, economic and social relationships that govern the world system using system dynamics to suggest a growing population and increasing consumption. However, the resources are constantly decreasing, and the pollution is increasingly severe, which restricts the growth of production. Although the continuous progress of science and technology can play a role in promoting production, the effect is limited to a certain extent, so the growth of output is limited. The second is the knowledge economy theory, which believes that the main driving force of economic development is knowledge and information technology, and the knowledge economy will be the foundation of the sustainable development of human beings in the future. The third is the ecological theoretical basis of sustainable development, which means that according to the sustainability requirements of the ecosystem, the economic and social development of human beings should follow the three laws of ecology: first, the principle of high efficiency, namely, the efficient use of energy and the recycling and reproduction of waste; The second is the principle of harmony, that is, the harmonious symbiosis and co-evolution between the various components of the system; The third is the principle of self-regulation, that is, the evolution of synergy focuses on the perfection and continuity of the self-regulation function of the internal organizations, rather than the simple growth of external control or structure. The fourth is the theory of population carrying capacity, which refers to the earth system's resources and environment. Due to the threshold of self-organization and self-recovery power, the population’s carrying capacity is limited at a specific technological level and stage of development. The impact of the number of people and the socio-economic activities of a given number of people on the earth system must be controlled within this limit. Otherwise, it will affect or endanger the

sustainable survival and development of human beings The theory has been hailed as one of the three most important discoveries of the 20th century. The fifth man-earth system theory states that human society is an integral part of the earth system, an essential part of the biosphere and a primary subsystem of the earth system. It is produced by the earth system, and at the same time has a close relationship with each subsystem of the earth system, mutual restriction and mutual influence. Man-earth system theory is the core of earth system science theory, an essential part of land system science theory, and the theoretical basis of sustainable development.

PEST analysis [49, 50] is a method of analyzing the macro-environmental factors that can affect the competitiveness of the China's tourism industry. It involves analyzing macro factors such as the political, economic, social, and technological environments. As shown in Table 1.1.

Table 1.1 - PEST Analysis as scientific method

Political environment (P) Relations with all levels of government Governmental policy The relationship with the surrounding environment Various legal contents	Cultural Environment(s) Demographics, geography Lifestyle changes Living environment Social value
Economic Environment (E) Economic situation GDP trends Inflation rates and changes in interest rates Overall employment Per capita disposable income expenditure	Technical Factors (T) Research on technological developments Development of construction technology The current state of practical technology Technology integration for tourism development

Source: [50]

The PEST model is divided into four categories, with the political environment focusing on government regulation and standards, tax requirements, policy preferences, subsidies, and government support. The economic environment focuses on factors such as national income, GDP, and the disposable income of the target audience. The social environment considers factors such as the education level of the target audience, religious environment, national values, and the customs of

certain regions or ethnic groups. The technological environment looks at the development of relevant industry technologies and the status of patent applications and holdings[51-58].

The evaluation indexes of tourism activities include tourism ecological footprint, tourism carbon footprint, tourism carbon emission and tourism ecological efficiency.

Touristic Ecological Footprint (TEF) is the application of the concept of Ecological Footprint in tourism, which specifically refers to "the biological production land area necessary for the consumption of various resources related to tourism activities and the absorption of wastes within a certain time and space range". In fact, it is a vivid expression of the ecological consumption of tourists in the related links of tourism.

The concept of Carbon Footprint (CF) originates from ecological Footprint, which mainly refers to "the total amount of gases emitted in human production and consumption activities related to climate change". Carbon footprint also analyzes the carbon emissions directly or indirectly related to the life cycle of products or activities from the perspective of life cycle. But at present, scholars of various countries have different understandings and understandings on the definition of carbon footprint and have not reached a unified conclusion. See table 1.2.

In the above definition of carbon footprint, the foreign scholar Feldman's definition is reasonable, but there are also shortcomings, ignoring other greenhouse gas accounting except for CO_2. The domestic scholars Ji Junping and Ma Xiaoming further modified and improved the definition of carbon footprint, which is the most reasonable.

Tourism carbon emission is directly or indirectly emitted by tourists or tourism enterprises in the process of tourism activities and management. Tourism is a typical comprehensive industry, involving many links. In order to accurately calculate the carbon emissions of tourism in a certain region, relevant departments involved in the tourism process must be defined first. Due to the lack of monitoring the current domestic tourism system of carbon emissions, not directly to obtain data

on tourism in carbon emissions, carbon emissions and tourism stems mainly from tourism related department to release the carbon emissions, so the existing measuring carbon emissions research mostly carbon emissions by measuring tourism departments and tourism to a comprehensive accounting of carbon emissions.

Table 1.2 - Concept of Carbon footprint

Source	Define
Energetics	Carbon footprint refers to the total amount of carbon dioxide emitted directly and indirectly by human beings in economic activities
WRI/WBCSD	The carbon footprint is defined as three levels: the first level is the direct carbon emissions from the organization itself; The second extends the boundary to direct carbon emissions from the sector that supplies the agency's energy; The third level includes direct and indirect carbon emissions throughout the life cycle of the supply chain
Carbon Trust	Carbon footprint is a measure of the carbon dioxide emitted and the carbon dioxide equivalent converted from other gases over the life cycle of a product
WIEDMANN &Minx	Carbon footprint refers to the total amount of carbon dioxide emitted by a product or service system during its life cycle. On the other hand, it is the total amount of carbon dioxide emitted directly or indirectly in the process of an activity. The main body of activities includes individuals, organizations, governments and industrial sectors.
Geng Yong Dong Huijuan	A carbon footprint is the total amount of carbon dioxide emitted, directly or indirectly, over the life cycle of an activity or product, or from an area.
Ji Junping Ma Xiaoming	Carbon footprint is a measure of greenhouse gas emissions caused directly or indirectly by a product or activity over its life cycle, calculated by the total amount of carbon dioxide.

Source: author´s development

Tourism ecological efficiency is applied to Tourism in the academic circle after ecological efficiency is put forward, and it is also the further extension and development of eco-tourism, Sustainable Tourism, Green Tourism and other concepts. In previous studies, the concept of tourism ecological efficiency was clearly proposed in limited literature. Most scholars at home and abroad, such as Gossling, Yao Zhiguo and Li Peng, considered that tourism ecological efficiency was an important indicator to measure the proportion between tourism development benefits and environmental impact based on the WBCSD definition of ecological efficiency. (specific definitions are shown in table 1.3), you can see that the domestic

and foreign scholars generally use the indicators such as gross income of tourism, tourist accumulated characterization of tourism development effectiveness, using carbon emissions or tourism ecological footprint of tourism, tourist carbon footprint measures such as characterization of tourism impact on the environment, the essence emphasizes the impact on the environment and resources to minimize, maximize economic output, To achieve the optimum between environmental impact and economic value.

Table 1.3 - Concept of tourism ecological efficiency

Researcher	**Concept**
Gossing	Tourism eco-efficiency is expressed by the ratio of carbon emission to tourism income
Yao Zhiguo	Tourism ecological efficiency is expressed by the ratio of environmental impact carbon footprint, resource input, energy consumption and economic output
Li Peng	The ecological efficiency of tourism routes is equal to the environmental impact/value of products and services
Zhang Jinhe	Tourism ecological efficiency is expressed by the ratio of carbon dioxide emission to tourism income
Zhen Qiang	It is considered that tourism ecological efficiency is expressed by the ratio of tourism income to carbon emission generated by tourism resource consumption and waste
Xiao Jianhong	Tourism ecological efficiency is the ratio of greenhouse gas emissions generated in the process of tourism to tourism income, which represents the relationship between tourism economic development and its pressure on the ecological environment

Source: author´s development

The index system of ecological efficiency includes two parts: economic efficiency and environmental efficiency. At present, the calculation formula and model of ecological efficiency proposed by WBCSD are widely accepted in application:

The basis of ecological efficiency research(Alberca-Oliver, Rodriguez-Oromendia, & Parte-Esteban, 2015) is ecological efficiency measurement, and the accounting methods of ecological efficiency measurement mainly include single ratio method, index system method and model method. These three ecological efficiency measurement methods have their own scope of application and

shortcomings in practical application. Through the review of relevant literatures at home and abroad, it is found that the model method is most often used in the existing literatures due to the complex variables to be measured.

The tourism ecological efficiency measured by this method can be divided into two dimensions: economic dimension and ecological dimension. The economic dimension includes tourism income, tourism per capita income, etc. The indicators of ecological dimension include resource consumption, resource consumption and carbon dioxide emission. The advantage of the single ratio method is that it can give a simple ratio that is easy to understand. The deficiency point is that it is difficult to guide decision-making practice in practical application because the optimal ratio set is not given. In the accounting of tourism ecological efficiency, due to the many and complex variables involved, the single ratio method has a relatively narrow scope of application and is seldom used in accounting.

The independent and interrelated indexes constitute the index set of tourism ecological efficiency, and the index system method is generally applicable to analyze more complex objects. Because each index system of index concentration can reflect the overall coordination degree and development level of each subsystem of society, economy and nature in a certain region to a certain extent. In the application of the index system method, the index components are analyzed from the social, economic and ecological aspects, mainly including the following categories: material consumption, energy consumption, water consumption, land, labor force and environmental impact.

When the multiple input and multiple output objects, the single ratio method is no longer suitable for the actual problem, the reason for this is that the single ratio method when use needs to be translated into the value of a single, comprehensive value should be given in weight, and weight of a given tend to lose objectivity, and using the method of model can make up for the inadequacy of the single ratio method in some ways. On model selection, generally USES the input-output model, among them, the input indicators include economic indicators of tourism professionals and tourism land use in land use quantity, output indexes is given priority to with the

added value of tourism, and based on input-output matrix to calculate the land use change and tourism practitioners to the influence of the added value of tourism. In sorting out the literatures on tourism ecological efficiency evaluation in recent years, most of them use DEA method for evaluation. The introduction of eco-efficiency model in the analysis of environmental impact of tourism has been unanimously affirmed, and this model is still used in the subsequent studies. Matthias F took labor force, infrastructure and natural environment as input indicators, tourism income, employment rate, market share and net income as output indicators, and applied DEA measurement to study tourism efficiency. Maria C took the number of museums, relics and historic sites, the proportion of tourism school graduates in the labor force and the number of employments in the tourism industry as input indicators, and the number of overnight beds as output indicators to measure tourism efficiency by DEA&SFA comprehensive model. Laurent B also uses DEA model to calculate tourism efficiency by taking the capacity of reception facilities and the number of tourists as input indicators and the number of overnight stays as output indicators. Carlos B used DEA measurement method to cover a wide range of input indicators, including employment number, government investment in tourism in a special year and total number of reception facilities. Output indicators include total number of international tourists, total number of domestic tourists, average stay time of international tourists and average stay time of domestic tourists.

Scholars' research on tourism efficiency covers a wide range, especially with the introduction of the concept of all-for-one tourism, the definition of tourism input and tourism output becomes more ambiguous. Therefore, it is necessary to explore a tourism measurement method that is more consistent with the law of global tourism development. From the perspective of input-output, the main difference between tourism ecological efficiency and tourism efficiency is the ecological environment index, so the tourism ecological efficiency measurement method can be further refined on the ecological efficiency measurement method, ecological efficiency measurement provides a theoretical basis for tourism ecological efficiency measurement.

Energy consumption during travel can cause important environmental problems. Therefore, restricting the use of unclean energy and guiding the research and development and utilization of new energy have become a prerequisite for the sustainable development of tourism. In 2021, carbon dioxide emission peak and carbon neutrality were included in the government work report for the first time. China solemnly pledges to the world to strive to achieve the goals of carbon emission peak and carbon neutrality by 2030 and 2060, respectively. Then, these became the "hot words" of people's discussion. According to different situations, various departments proposed specific measures to implement carbon emission peak and carbon neutrality. Tourism is an essential part of the world economy. How it can promote economic growth while reducing its adverse impact on the environment and increasing the productivity of natural resources is of great significance to the global response to climate change. Tourism eco-efficiency is an indicator of its sustainability measured by economic output per unit of carbon emissions. Its specific accounting involves two factors: environmental impact and economic benefits. Among them, the emissions of the three wastes (wastewater, exhaust gas, and solid waste) represent environmental impact, and tourism revenue represents economic benefits. However, achieving carbon emission peak and carbon neutrality is a systematic project. It involves not only economic development and the transformation of traditional industries but also forward-looking investment in emerging fields. While the development of the tourism industry plays a huge role in stimulating consumption, promoting employment, and promoting global exchanges between countries, it also causes certain pollution to the environment, such as carbon emissions from transportation, catering, and shopping. Improving the eco-efficiency of tourism can achieve a two-way effect: this can not only promote economic development but also reduce costs and the environmental impact of tourism. In response to China's green and low-carbon concepts and to promote the healthy development of tourism, the impact of tourism on the ecological environment has gradually attracted widespread attention from researchers. Tourism eco-efficiency combines economic growth with the environmental load. It can be used to analyze

the economic benefits and environmental impacts of tourism, emphasizing the maximization of economic benefits and the minimization of environmental impacts in the development of tourism. Starting from the economic output per unit of environmental impact, the most efficient value is used as an evaluation index to evaluate the sustainability of tourism development, which can quantitatively analyze the sustainable development of the tourism industry. Therefore, it can establish a new theoretical system for evaluating the sustainable development of tourism. In this study, empirical research is conducted on economic development and the ecological environment. It reveals that improving the eco-efficiency of tourism can achieve a two-way effect: reducing costs and environmental impact while creating new job opportunities in the market. The research method of this paper generates a new research direction for sustainable tourism development, and the research results lay a scientific foundation for the formulation of low-carbon tourism, tourism carbon emission peak, carbon neutrality, and other policies.

Through the scientific analysis of the ecological resources of scenic spots, the long-term mechanism of ecological restoration of tourist destinations is established, and the carrying capacity and self-recovery ability of the ecological environment of tourist destinations are improved through the renewal of scientific and technological means.

(1) Financing channels

Since the reform and opening up, China's tourism field has achieved a leaps and bounds of development, the scope of the field continues to increase, the field system is increasingly perfect, the field foundation is more solid, China has entered the ranks of big countries in the field of global tourism. However, there are still many disadvantages to be dealt with in the progress of tourism, such as ecological disadvantages. But what should be mentioned here is the disadvantage of single financing method, which is the key problem that hinders the progress of tourism in China, especially in underdeveloped regions. Therefore, we should make full use of abundant funds at home and abroad to broaden the financing platform for the development of provincial tourism industry.

(2) Enterprise support

As a component element of tourism system, tourism enterprises' development vitality has an important influence on the development of tourism industry, and the development state of tourism enterprises directly affects the operation state of tourism industry. China's tourism market is affected by many factors, the development time is short, the market system is not perfect, and the development ability of tourism enterprises is uneven, which determines the sustainable development of China's provincial tourism industry and will face great difficulties in market operation.

(3) Marketization operation strategy.

To government agencies as a guide, according to the principle of tourism market competition, develop tourism products suitable for travel request, absorb each category of market group, and the financing way of tourism field assisted some emerging tourism enterprises with higher technology content, promote helps tourism group progress in the field of system construction, strengthen and support tourism support areas.

(1) Strengthen talent support and promote the cultivation and exchange of tourism human resources. To build a sound social environment, we must solve employment and re-employment, reform the income distribution system, establish and improve the public service system and other projects related to people's livelihood. Tourism industry is a labor-intensive industry, although there is a certain need for the number of professionals, but the key is the high level of personnel quality needs.

(2) Infrastructure. Infrastructure is to cater to the needs of tourists in sightseeing, play and set up all the material facilities, the development of tourism indispensable material guarantee. It mainly covers tourist hotels (guesthouse), tourist transportation and various cultural entertainment, sports, recuperation and other material equipment.

(3) Tourism product promotion. As one of the main means of modern marketing, product publicity is particularly important in the tourism market. The

premise of sustainable development of tourism industry in the province is that tourism products in the province get the attention of consumers, and only when tourists pose a challenge to the carrying capacity of tourist destinations will sustainable development be touched.

The policy system

(1) Improve policies and policies to provide a platform for inter-institutional integration. The sustainable development of tourism industry is the result of the synergy between mechanisms. It is a prerequisite for the sustainable development of provincial tourism industry to create a good platform environment for the coordination of the five mechanisms through the optimization of policies and guidelines.

(2) Tourism investment policy orientation. Tourism investment policy should actively create the pattern of "government leading, enterprise leading". The government can not only guide and supervise the capital investment in the tourism field through policies and institutions, but also directly join the capital investment in the tourism field.

(3) Improve the tourism regulatory system. The sustainable development of tourism depends on the conscious actions of relevant people. After the promulgation of the Tourism Law, all provinces should strengthen the implementation of the law in terms of policies and strengthen the supervision of the tourism industry.

(4) Construction of tourism market credit system. The tourism industry cannot operate without contract. The fairness and validity of the contract depend on the amount of information and credit of both parties. Because information asymmetry exists objectively, contracts naturally have certain risks. The contract risk caused by information asymmetry can be reduced only by the credit enhancement of both parties.

(5) A system of inspection and notification of typical cases has been established. We will vigorously promote the implementation of the Tourism Law and standardize market behavior.

Technical environment

With the development of the tourism industry, the demand for ecological, economic, and social environment for the continuous progress of provincial tourism industry will continue to improve. To guarantee the support of these peripheral environment to the sustainable development of provincial tourism industry, accelerating technological progress has become an important means. Pay attention to the technical content of tourism products. Discover and broaden the concept of popular science and culture in the original tourism commodities, and enhance the quality of tourism commodities; There is emphasis on the development of a large number of prominent features, cultural science and entertainment as one of the tourism projects; Publishing tour guides and commentary with unique style, rich content and high cultural quality; With the help of the power of science and technology, with advanced production technology and artistic imagination, we can produce various tourist goods and souvenirs by using the waste from the corners, and turn the decadent into magic

1.3 International experience of tourism management in various countries

At present, in the United States, France, Italy, Spain, Germany, Japan and other developed countries, tourism has formed a standardized development. The role of government and its policies has played a leading role in tourism. Under the guidance of capital, policy support will be given to make tourism a powerful tool to reduce pressure and boost economic growth. It has formed a multi-functional, multi-level and multi-directional management pattern, and the government plays a crucial role in tourism.

The study of tourism began in the 1960s, primarily focusing on the economic impacts of the tourism industry. In the 1980s, the concept of international competitiveness emerged, leading scholars to investigate the competitiveness of the tourism industry. By reviewing literature from 2010 to 2022, a trend analysis of relevant documents in the Web of Science (WOS) was conducted, and the results are

presented in the following figure:

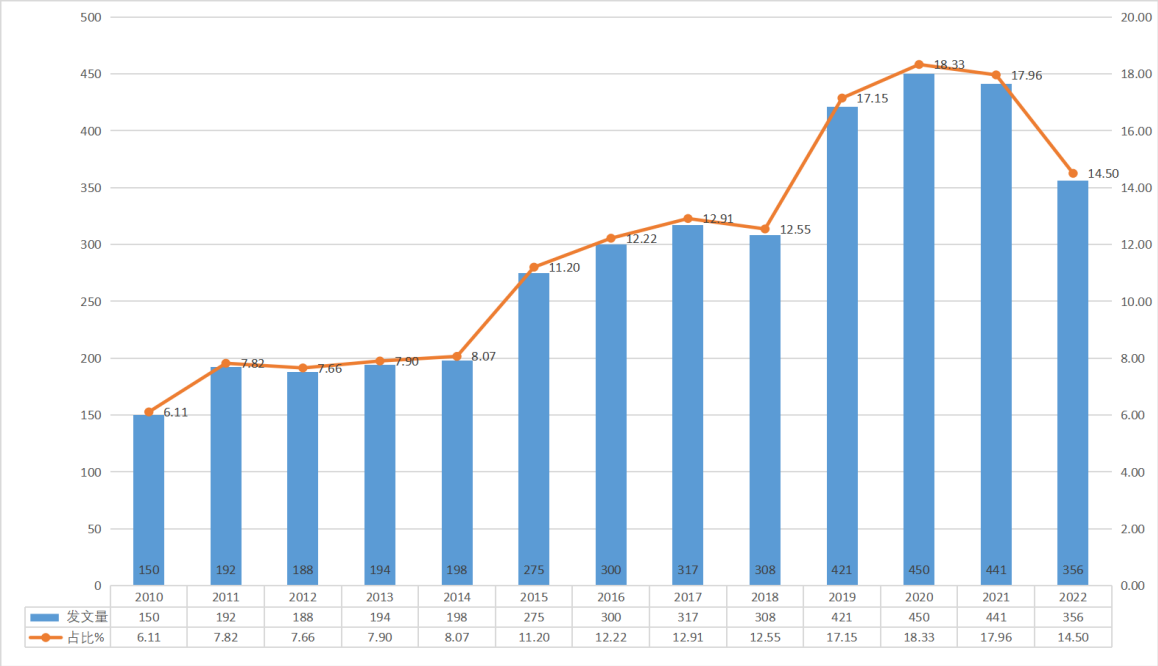

Figure 1.5 Numbers of articles published in WOS database

Source: author´s development

It can be observed that there is a relationship between the number of papers on tourism industry competitiveness and time changes. Based on the collected data, there were 3,790 papers on tourism services, tourism industry competitiveness, and international tourism competitiveness published from 2010 to 2022. A trend graph was created by conducting statistical analysis on the number of papers published each year. It is evident that the research on tourism services, tourism industry competitiveness, and international tourism competitiveness showed a stair-step increase, with the overall number of papers increasing each year. Moreover, the graph shows a steady and gradual increase in the research from 2010 to the present, with a relatively uniform growth rate from 2010 to 2014. From 2015 to 2021, the number of papers published each year increased rapidly, reaching its peak in 2020 with 450 papers published. This phenomenon is attributed to the rapid development of international tourism, which has attracted significant attention from the research community. It indicates that the study of this field has become a trend from 2019 to 2021.

Looking at the keywords of the published articles, as shown in Figure 1.6, a

total of 367 high-frequency keywords were found. The size of the nodes and text in the figure represents the frequency of the keywords. It can be seen that "tourism" and "competitiveness" are greater research nodes and are hot topics in tourism research. In terms of research on "tourism" and "competitiveness", it mainly focuses on the following related aspects:

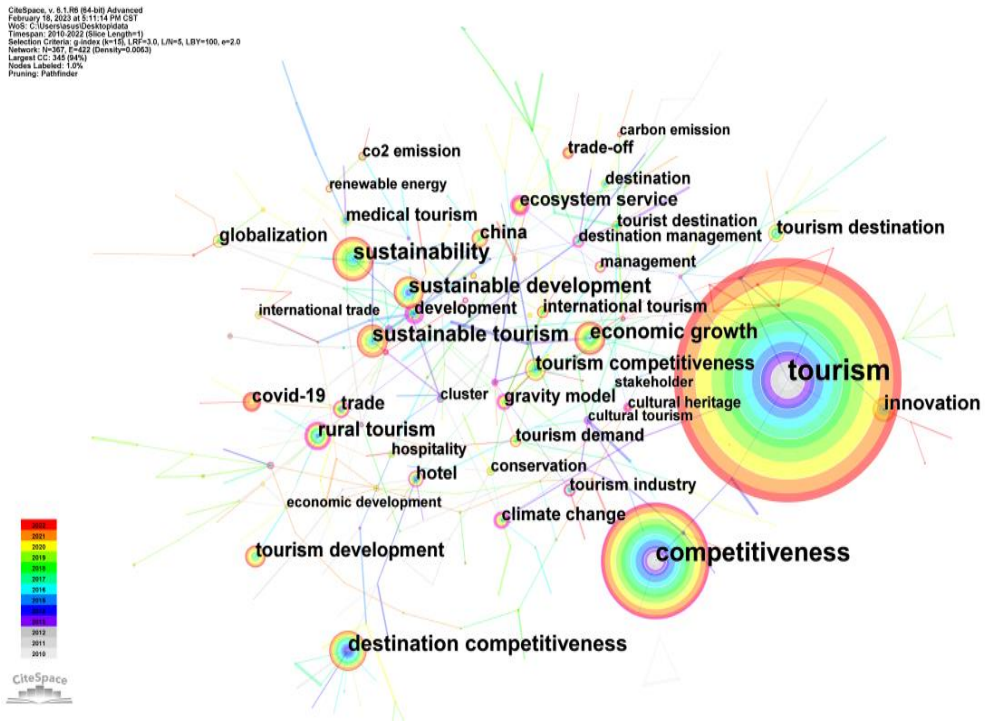

Figure 1.6 Keywords distribution of WOS

Source: author´ s development

(1) Research on the impact of tourism development on the economy

The development of the tourism industry often has a positive impact on the economic development. McKinnon pointed out that the development of the tourism industry can increase a country's foreign exchange earnings and promote the development of the country's economy and services [59]. Khan stated that developing the tourism industry can promote tax revenue and employment [60]. Maria del P reviewed the theories related to competitiveness and indicators used to measure it, as well as research on the tourism industry and economic growth, and established the connection between these two concepts. By using a model, the determinants of a country's production and growth capacity were demonstrated [61]. Greg believed that developing countries often have abundant labor resources, and

they can vigorously develop the tourism industry based on this advantage to increase foreign exchange earnings [62]. Sequeira research shows that countries that develop tourism service trade grow faster than other economies. Therefore, many developing countries see the development of tourism service trade as part of their economic growth [63]. However, the development of tourism service trade may also lead to economic suppression. Copeland pointed out that the rapid expansion of the tourism industry may lead to the "Dutch disease", where non-traded goods prices rise due to resource transfer effects, expenditure effects, and the increase of real exchange rates, thereby squeezing out production factors that sacrifice the traded goods sector for development [64]. Some scholars such as Po and Huang pointed out that the relationship between the development of tourism service trade and economic growth is not simple positive or negative, but a nonlinear relationship that exists simultaneously between the two [65]. Figini and Vici believe that the determining factors of positive or negative relationships are the degree of tourism specialization and the degree of economic dependence [66].

Scholars in the early stages of tourism research focused on demands, discussing how tourism revenue changes with fluctuations in markets of tourist source. Wober analyzed the competitiveness of the US tourism service trade from a demand perspective and found that prices, per capita income, exchange rates, and transportation costs have a significant impact on tourism demand[67]. Claveria believed that per capita disposable income and leisure time are necessary conditions for outbound tourism and have an important impact on international competitiveness[68]. P. Griess is one of the first scholars to analyze tourism from a resource perspective, believing that a country with more unique tourism resources has a larger market share[69]. Some scholars focus on studying tourism from perspective of resource supply. Akvile Cibinskiene and Gabriele Snieskiene used qualitative and quantitative analysis to evaluate urban tourism competitiveness, finding that the most significant external environmental factors affecting urban tourism are the status of the destination, the monetary policy, and education systems, while internal environmental factors such as travel agencies, theaters, and zoos are

the most important[70]. Noela Michaela, Yvette Reisingerb, and John P. Hayesc used hierarchical regression to analyze the convenience sample of 311 entrepreneurs from three aspects: destination resources, destination infrastructure and support services, and determined and measured the competitiveness of UAE tourism. The authors believe that these factors and the business environment determine the main factors of UAE tourism competitiveness. However, new findings suggest that human resource-related factors are more important than the destination[71, 72]. Anastasia Petrou and Irene Daskalopoulou analyzed the impact of social capital and network business relationships on the competitive performance of tourism enterprises, indicating the effect of networking. Successful entrepreneurial decisions can be made through the environment and the company's management knowledge[73]. Sampson and Snape pointed out that service production and consumption are synchronized in time and space, but producers may engage in cross-border movement, which is essentially the flow of cross-border factors[74]. Haijun Liu and Mihray Hasan evaluated tourism competitiveness from a spatial perspective and used empirical analysis to study the impact of different factors on tourism competitiveness[75]. D. Fodness and W. Sehertler compared the comprehensive quality management of European tourism destinations and applied the European Foundation for Quality Management (EFQM) multi-dimensional model to gain a preliminary understanding of European tourism destinations and improve their comprehensive quality management[72, 76].

Robertico used a measurement method to identify the factors that influence the competitiveness of tourism service trade, and found that the quality of life and people's satisfaction have a greater impact on the competitiveness of tourism service trade[77]. Okumus applied the theory of planned behavior to study why Americans are unwilling to travel to China, and found that cultural differences, long-distance flights, visas, and unfamiliarity with China are the main reasons. Hassan, Suzan B. Soliman, Mohammad discovered that during COVID-19 pandemic, the fear of epidemics will greatly reduce people's willingness to travel, which will lead to a decline in the international competitiveness of tourism service trade, after evaluating

the social responsibility of tourist destinations, destination reputation, and tourist trust[80]. Garay, Lindsay-Smith, G. found that disasters like COVID-19 have a strong negative impact on the mental health of tourism practitioners, especially those in small and medium-sized enterprises. During the pandemic, the mental health of them is very low, which will reduce the resilience of enterprises and ultimately affect the international competitiveness of a country's tourism service trade[81, 82]. Khan H, ChouF S, Wong K C. re-estimated the tourism multiplier effect of Singapore using data of input-output table, which produced direct and indirect effects reflecting the impact of tourism expenditure on output, income, employment, and imports, and proposed solutions[83]. Alain Duperas, Neil McCallum believe that the analysis of the factors influencing tourism development should be measured from the following aspects: gross domestic product of tourism, per capita income of inbound tourism divided by source market, overnight stays in all types of accommodation, tourism service exports, labor productivity, purchasing power and prices, visa requirements, natural resources and biodiversity, cultural resources, tourist satisfaction, and national action plan of tourism, as well as proposing some supplementary indicators[84].

Information technology, e-commerce, and social media have a strong influence on public opinion and can affect tourists' choice of destinations, thus impacting a country's international competitiveness in tourism services. Zhang Lianfeng believes that the development of mobile e-commerce has a certain promoting effect on the tourism industry and international cooperation should be carried out to promote sustainable development in tourism [85]. Sung-Kun Kim believes that providing information for tourists on social media is receiving increasing attention from tourism researchers, and further research on the impact of business intelligence and website design on the formation of destination image provides different insights for tourism marketers [86]. Dimness studied the impact of the internet on the international competitiveness of tourism and found that the dissemination of information networks improves the matching of supply and demand, thereby promoting the international competitiveness of tourism service trade. With the

development of the internet and e-commerce, online consumer reviews have become an important source of information to help consumers make purchasing decisions. Zhang, Kem Z. K. Zhao, and Sesia J. used a heuristic system model to identify important factors that influence consumer purchasing decisions. They found that the quality of online reviews, characterized by perceived information and perceived persuasiveness (system factors), significantly affect consumers' purchasing intentions, elucidating the relationship between heuristic and system factors [87]. Zhang, Hongmei Fu, and Xiaoxiao studied the relationship between destination image and tourist loyalty, including 14 hypotheses. The results showed that the impact of destination image on tourist loyalty was significant but varied in degree [88].

China's tourism industry started late, and research on it began after the 21st century. Most of research in China are measuring tourism competitiveness, studying the factors influencing the tourism industry, exploring the degree of coupling between tourism development and the economy [89]. By reviewing literature on CNKI, the research trend between 2010 and 2022 is shown in the following graph.

Figure 1.7 shows the publication trends in the research fields of tourism, tourism competitiveness, and international competitiveness of tourism services over the past 12 years, with a total of 884 relevant publications from 2010 to 2022. Overall, the trend exhibits fluctuating development. The number of publications was low in 2010, which may be due to limitations in research methods and a lack of high-quality literature at that beginning stage. As research methods and content became richer, the number of publications grew rapidly from 2011 to 2014, reaching a peak of 102 publications in 2015, the highest since 2010.

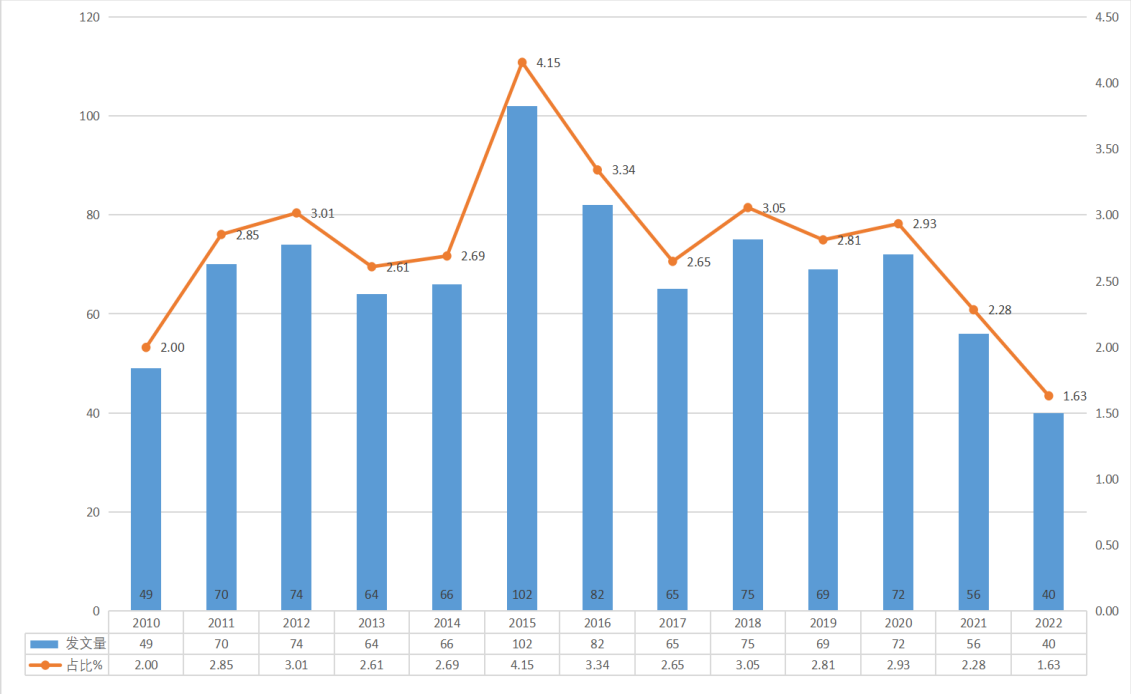

Figure 1.7 Numbers of articles published in CNKI(Chinese database) database

Source: author´ s development

This topic may have received widespread attention during this period. The number of publications slightly decreased in 2016, which coincided with China's trade deficit in tourism imports and exports. Since then, the number of publications has shown stable development with fluctuations, indicating a period of stable development in this field. The co-occurrence of keywords is shown in the following graph.

From the Figure 1.8, it can be observed that " China’s Tourism Service Trade ", "Service Trade", and "International Competitiveness" are significant nodes, indicating that they are hot topics in tourism development research. Keywords are a summary of the core content of the literature. Analysis of the co-occurrence of keywords can capture the current research hot topics on tourism services, competitiveness, and trade deficits. The following are focuses:

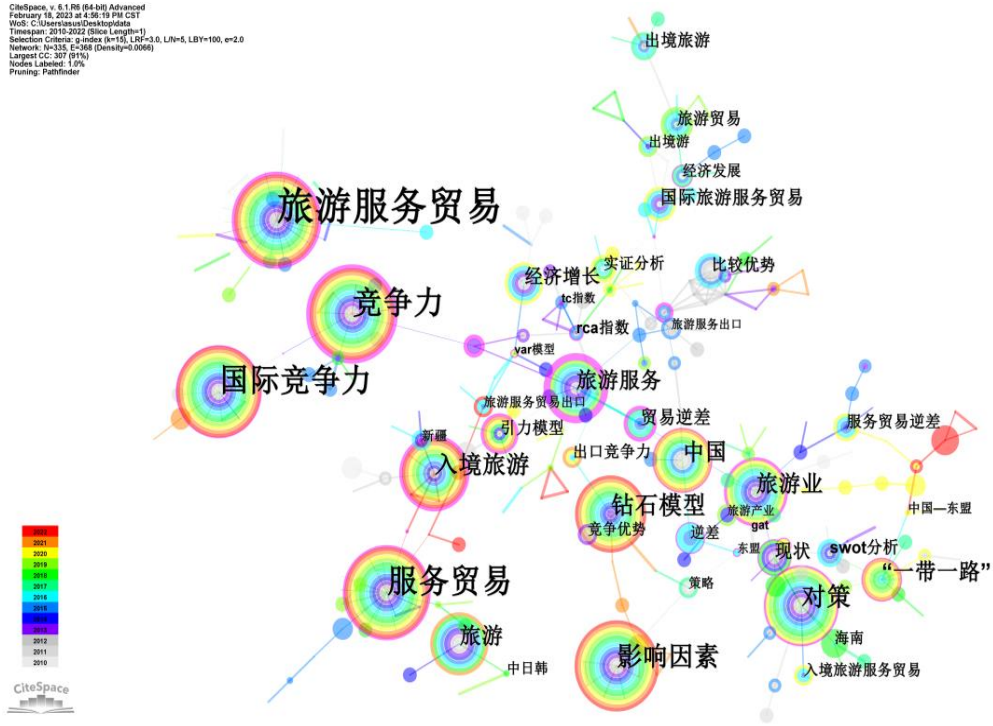

Figure 1.8 Keywords distribution of CNKI database

Source: author′s development

Zhao Shuhua used the comparative advantage index to quantitatively analyze the balance of payments of the top nine countries in foreign exchange income of tourism and analyzed the international competitiveness of tourism in each country. It was found that Spain, China, France, the United States, Italy, and Mexico have comparative advantages, while Germany, the United Kingdom, and Canada have comparative disadvantages[90]. Jiang Yimao *et al.* broke through traditional competitiveness indicators and measured the contribution rate of tourism resources, ranked various factors, calculated reasonable weights, and designed a new evaluation system[91, 92]. Ouyang Yang used export market share, TC index, and revealed comparative advantage index to analyze the competitiveness of tourism service trade in China, Japan, and South Korea. The study found that China's market share is higher than Japan and South Korea. From the TC index and the revealed comparative advantage, China has a relative comparative advantage, while Japan and South Korea are in a disadvantageous position[93]. Zhang Yulong used market share, TC index, and RCA index to analyze the competitiveness of tourism service trade in China, the United States, Japan, and Australia. It was found that China's

tourism service trade develops rapidly and on a large scale, but lacks comparative advantages[94, 95]. Shang Xiuzhu used market share, TC index, RCA index, and degree of trade openness to analyze the competitiveness of China's tourism service trade. It was found that China's tourism service trade develops rapidly and on a large scale, but has high volatility and lacks comparative advantages, and overall, is at a medium level[96]. Xuan Zhenkai used market share, TC index, and RCA index to compare competitiveness of China, Australia, France, Germany, Italy, Japan, Spain, the United Kingdom, and the United States, and found that China developed tourism on a large scale, but not a tourism power, indicating that China's international competitiveness in tourism service trade is continuously weakening[97]. Li Zhiwei used the "Michaely" volatility index (MI index) to point out that China's MI index has been negative for seven years since 2010, and its absolute value has been increasing year by year, indicating that China's international competitiveness in tourism service trade is continuously weakening. Wen Yan found through trade data from 62 countries that China belongs to the "beneficiary-turned-spender" in the international division of tourism service trade, and that China's inbound tourism has been stagnating or even declining since the Wenchuan earthquake and the financial crisis, indicating weak international competitiveness[99]. Fei Jiaoyan and Cao Yunshi used the trade competitiveness index (TC) and the revealed comparative advantage (RCA) to find that although China's competitiveness in tourism service trade has significantly increased, its trade deficit has been increasing[100, 101]. Cao Yunshi and Wang Shansong used principal component analysis (PCA) from a statistical perspective to comprehensively analyze and evaluate the economic growth quality of Jinan City, and proposed two suggestions to improve it[102].

(2) The impact of tourism competitiveness

The factors influencing the development of the tourism industry can be divided into two categories. The first category uses Michael Porter's Diamond Model from "The Competitive Advantage of Nations" as the basic framework for analyzing the factors. These factors can be divided into the following categories: production elements, demand elements, related support industries, corporate strategy, structure

and performance of competitors, opportunities, and government. However, because opportunities and government are difficult to find clear indicators to quantify, most scholars do not consider them when conducting empirical research. Although the Diamond Model's theoretical framework is relatively fixed, leading to relatively concentrated and similar selected variables, there are many quantifiable indicators for the same element, so the selection of variables can also be diverse[103]. For example, Wang Sainan selected the number of tourism majors, GDP, per capita disposable GDP of urban residents, and the number of domestic travel agencies as dependent variables. The study showed that domestic GDP and the number of domestic travel agencies have a significant impact on China's tourism service trade[104, 105]. Geng Xianhui, on the basis of the Diamond Model, innovatively selected the degree of openness of tourism (OT), foreign direct investment (FDI), labor productivity in the tourism industry (LP), and natural disasters as external environmental constraints. The research showed that trade openness, foreign investment, and labor productivity have a significant impact on China's tourism service trade, and natural disasters increase the uncertainty of tourism, which will to some extent reduce people's willingness to travel[106]. The second category introduces new variables or studies a single variable based on the framework of the trade gravity model. For example, Liang Chunmei believed that publicity and brand awareness have an important impact on tourism service trade. China mainly uses material or information dissemination methods such as participating in promotion and trade fair, and the publicity is not effective enough, which cannot improve the popularity of China's tourism products, leading to China's low competitiveness in tourism service trade. Yang Changchun used the VAR model and found that there is a long-term stable relationship between China's international air passenger transportation and inbound tourism service trade, and international air transportation promotes the growth of inbound service trade[108]. Lin Yuxia used panel data on world heritage sites in various provinces in China from 1999 to 2014 and found that world heritage sites have an important impact on the number of inbound tourists and inbound tourism revenue[109]. Guo Mingying used the trade gravity model for

empirical analysis and found that per capita GDP of both import and export countries, free trade agreements, and relative trade freedom all have a significant impact on China's tourism service trade[110]. Li Zhiwei used gray correlation analysis and found that the impact of government, human capital, and capital investment on the competitiveness of tourism service trade is extremely significant, while the impact of technical elements is smaller[111]. Xiong Zhenqin believed that China's air pollution has become one of the main factors affecting inbound tourism[112]. Li Mengqing found through econometric analysis of cross-country panel data from 1985 to 2010 that the appreciation of the local currency will have a third-party market effect on tourism service trade, that is, it will promote local-to-destination tourism service trade, also, it will reduce third-party tourism service trade beyond local-to-destination[113]. Bai Ruoxuan used Hofstede's six-dimensional theory and combined panel data from 15 countries between 2009-2015 to find that cultural differences have a significant impact on the development of tourism service trade. Xia Jiechang found that the internet has a significant positive impact on it.

"Tourism +Internet" has given rise to numerous new tourism models, including tourism e-commerce. With the gradual opening of national policies and the increasingly perfect industry standards, more and more high-quality and well-serviced tourism e-commerce enterprises have expanded their influence in the industry's development. After a period of rapid growth, online and offline development have progressed together, and the revenue of the tourism e-commerce has reached trillions *yuan*, with an online penetration rate of 16.9%, which continues to increase. According to the "Analysis Report of China Tourism Industry Development in the First Half of 2020" by bigdata-research.cn, tourism e-commerce products are becoming more diverse, not only covering traditional accommodation, transportation, and ticketing but also expanding into car rentals, insurance, and other businesses. The low cost of living and higher disposable income in third- and fourth-tier cities have led to an increasing penetration rate. In the first half of 2020, the tourism e-commerce industry was negatively affected by the pandemic. However, with the end of the pandemic, China's tourism e-commerce has rapidly developed,

with influential companies such as Ctrip, Qunar, Fliggy, and Tongcheng Elong leading the way.

With the emergence of the concept of the digital economy, scholars have explored the application of e-commerce technology that affects the development of tourism enterprises. Ma Shuzhong and Guo Jiwen analyzed the factors affecting the development of the digital economy and believed that the economy, capital, information, and other aspects would significantly influence the development of the tourism economy[117]. Yang Luming, Gu Huan found that the growth of Internet users, online consumption, and the adoption of new technologies could accelerate the development of the tourism industry[118-120].

In summary, scholars' research on the tourism industry focuses on theoretical and economic aspects, with less research on international competitiveness, and few studies on China. Besides, there is a significant gap between different countries, so the reference value for China's tourism industry development is limited. However, the relevant econometric models are worth learning from[42, 121, 122]. Chinese scholars started researching inbound and outbound tourism relatively late but have made positive explorations[36, 47, 123, 124]. In terms of international competitiveness indicators, Chinese scholars usually use TC, RCA, and IMS to analyze international tourism competitiveness[40, 125-127]. The analysis of influencing factors is becoming increasingly complex, and the conclusions are becoming more accurate. However, the current literature uses outdated data, and the outbreak of the COVID-19 in 2020 significantly changed the global tourism service trade pattern. Therefore, this study will refer to Xuan ZhenKai's tourism industry competitiveness indicators for comparative analysis and select relevant indicators to analyze the factors affecting tourism competitiveness. The latest data is used to to obtain more timely conclusions[45, 97, 128, 129].

Tourism management is a complex field that includes key aspects such as the economy, cultural heritage, infrastructure, and international competition. Ensuring sustainable tourism development requires understanding and effective resource management, considering the needs of tourists, local populations, and businesses.

Technological innovations, infrastructural changes, and cultural exchange determine current trends in the industry. Successful tourism management not only promotes economic growth but also strengthens cultural exchange, increases competitiveness, and expands the international influence of a country or region.

The conclusions obtained during the analysis of the components of the tourism industry and development prospects indicate the key aspects that determine the dynamics of the industry. It is found that economic factors, such as tourism costs and revenues, interact with cultural and natural resources, determining the face and efficiency of the industry. Infrastructural changes, such as the development of vehicles and hospitality, can contribute to improving the quality and accessibility of tourism services. Potential areas of development are explored the use of technology to improve marketing and customer interaction, as well as the stimulation of sustainable and responsible tourism. It is important to emphasize that a successful development strategy should consider the interaction of all these components, considering global trends and the needs of the modern tourist. These findings identify fundamental aspects to be considered when developing effective strategies for managing the tourism industry, promoting its sustainable and innovative development.

The study focuses on the international experience of tourism management in different countries, especially in the United States, China and European countries, provides an opportunity to understand the various approaches and strategies they use to develop and manage the tourism industry. Observation of the U.S. experience shows the importance of public-private partnerships in tourism development. The United States successfully uses marketing and innovation to attract tourists, as well as actively develops technological solutions to facilitate travel. China has seen an impressive development of tourism, which relies on a rich cultural heritage and a large domestic market. The country focuses on the creation of large tourism infrastructure projects, which contributes not only to an increase in the number of tourists, but also ensures the diversity and sustainability of the industry. The European experience, particularly the countries of the European Union, emphasizes

the importance of cooperation between countries for the joint promotion of tourism. The principles of sustainable development and preservation of cultural heritage determine tourism strategies, which helps to ensure long-term development and high quality of tourism services. All of this suggests that international experience in tourism management is a valuable source of inspiration for developing tourism management strategies in other countries. The application of best practices, taking into account national circumstances, can help to effectively improve and balance the development of tourism at the international level.

Government plays an important role in the evolution of tourism industry organization. Its industrial policies, management system and coordination with non-governmental organizations have a significant impact on the evolution of tourism industry and are the most important external environment for the evolution of tourism industry organization. Due to different political, economic, social systems and national conditions, the tourism industry management system and industrial policies are quite different in different countries. China’s tourism development is different from the United States of the road, the development of China's tourism industry, tourism industry is the management system and market-oriented reform unifies, appropriate to the process, in the evolution process of the tourism industry management system, great changes have taken place in the relationship between the government and the market, the role of market allocation of tourism resources. The backward policies and regulations of tourism industry greatly restrict the overall competitiveness of China's tourism industry. Like other developing countries, China's tourism industry adopted the tourism industry policy of vigorously developing inbound tourism and earning foreign exchange income at the beginning of its development, thus obtaining a large amount of foreign exchange reserves in a short period. With the development of economy and the improvement of people's income level, the demand for domestic tourism is gradually increasing. China begins to regard tourism as a new growth point of national economy, and outbound tourism is also booming. In the inbound tourism to promote the development of domestic tourism and outbound tourism market pushed by "industrial policy" is a common

model of development, developing countries in the short term to achieve the purpose of earning foreign exchange and the development of economy, the extensive development mode is not conducive to the sustainable development of tourism industry and tourism industry's competitiveness. China’s tourism industry policy in protecting resources and environment and maintaining the market order and the larger gap with the United States, in terms of protection of tourism resources and environment, the United States established the national park service is responsible for the management of domestic national park, historic park or site, national history, the natural and cultural resources, such as national historical monument, Through the national park system and perfect laws and policies, tourism resources and environment are effectively protected. And China's national forest park, geological park, wetland park, scenic areas, nature reserve, the natural resources such as water conservancy scenic spot and historic and cultural resources separately belongs to the ministry of land and resources, Ministry of Water Resources, the state forestry administration, the State Oceanic Administration, state administration of cultural heritage, nearly 10 ministries and commissions such as JuBan management, China national tourism administration, is mainly responsible for marketing and tourist scenic spots in service quality assurance. As multi-management is involved, responsibilities and rights are often divided, and there is no unified policy to effectively protect these natural and cultural resources, which is easy to cause the destruction of resources.

In 2019, China's domestic tourism market ranked first in the world, outbound tourism market ranked second, and inbound tourism market ranked third. From the perspective of tourism market size, China has undoubtedly become a major tourism country in the world and occupies a pivotal position in the world tourism market pattern. However, through the comparative analysis of the organization characteristics, industrial structure, market order and industrial policies of the tourism industry between China and the United States, we find that There is still a certain gap between China and the world tourism power. In the context of the new era, how to deepen the reform and innovation of the tourism industry, promote the

transformation and upgrading of the tourism industry, and better build the tourism industry into a modern service industry that people are more satisfied with.

Development model of Chinese government has too much government on tourism market intervention, supervision and service function, a problem such as the current promoting China's tourism industry organization innovation, promote the tourism industry international competitiveness, the key to deal with the relationship between government and market, give full play to the market this "invisible hand" decisive role of tourism resources, we will gradually increase the marketization of tourism.

Facing the current trend of popular tourism demand and individualization, it is necessary to further seek to replace administrative logic with market logic, cultivate real market-oriented tourism market subjects, and give full play to the leading role of market mechanism in tourism industry operation, tourism resources development and tourism destination image building.

To strengthen the industrial convergence and promote the tourism industry structure optimization and upgrading industry integration is an important implement of high-level tourism industrial structure, the current tourism industry in China is facing a single tourism product, low product added value, high technology content is not a structural problem, should speed up to promote the tourism industry and agriculture, manufacturing, information, creative industry, health industry, such as industrial convergence, We will upgrade the structure of the tourism industry. Strengthening the application of scientific and technological Innovation and Improving the Structure of Industrial Technology Scientific and technological innovation promotes the transformation of tourism from labor-intensive to knowledge-intensive, and is the fundamental driving force for upgrading the structure of tourism industry. Accelerate the integrated application of scientific and technological innovation in the tourism industry, constantly improve the technological structure of China's tourism industry, and strengthen the role of technological progress in promoting the development of the tourism industry. The development of rural leisure tourism should be characterized by rural tourism and

leisure industry, supported by rural commercial and leisure real estate, and build an industrial chain of rural tourism. Through land integration and the introduction of urban infrastructure services, it can promote local transformation of farmers, develop rural service industry and agricultural modernization, and provide industrial support for urbanization. With the development of aging population in the world, and the increase of sub-health people brought by work pressure and lack of exercise, people's demand for health tourism is increasing day by day. Cultural industry and tourism industry have coupling factors that cross and support each other. Tourism and culture are deeply integrated and promote the transformation of cultural resources into tourism products, which plays an important role in promoting national image and enhancing national soft power.

Conclusions to section 1:

The purpose of this chapter is to define the basic concepts of this research, analyze the current research situation, the underlying theories and methods of the research, clarify the research scope, and the direction and focus of this research.

1.Clarification of basic concepts: Firstly, the tourism industry is a comprehensive industry involving activities such as catering, accommodation, transportation, amusement, entertainment, shopping, etc. Its development is based on the overall national economic development level, while also indirectly promoting the development of relevant departments of the national economy. Tourism management is a systematic process that requires coordination between various links and communication among various departments. Secondly, the competitiveness of the tourism industry includes domestic industry competitiveness and international industry competitiveness. China's tourism industry competitiveness is based on its own resources, providing tourism products and related services to consumers in other countries to gain profits in the market, in the context of trade liberalization.

2.The evaluation of tourism industry competitiveness is comprehensive and

cannot be represented by tangible objects. According to the definition, this competitiveness is the production capacity that meets international market demand, and the size of the production capacity can be reflected by market sales. Currently, indicators such as International Market Share (IMS), Revealed Comparative Advantage (RCA), and Trade Competitiveness (TC) are commonly used to evaluate the international competitiveness of the tourism industry.

3.The theoretical basis for measuring China's tourism competitiveness is explored, and through the sorting of data, comparative advantage theory, resource endowment theory, and international competitiveness theory are believed to be the theoretical basis for a country's tourism industry competitiveness, providing theoretical support for subsequent analysis of China's international competitiveness in tourism.

4.Due to the many factors that affect a country's tourism competitiveness, and the manifestation of cross-cutting, isolated aspects cannot be examined alone. Therefore, Porter's Diamond Theory is used to analyze from the aspects of production factors, demand conditions, related industry support, enterprise strategic structure, and government and current environmental opportunities.

5.Porter's Diamond Theory involves various aspects of politics, economics, society, and technology, so it needs to be addressed from four aspects to solve the problem of low competitiveness in China.

6.Through sorting the current research situation, current research on China's tourism competitiveness includes the impact of tourism development on the economy, the evaluation of tourism international competitiveness, the factors influencing tourism industry competitiveness, the impact of e-commerce technology on tourism industry competitiveness. By conducting research in these areas, we can clarify the key areas for improving China's tourism competitiveness.

2 THE DEVELOPMENT STATUS OF CHINA'S TOURISM MANAGEMENT

2.1 The characteristics of China’s tourism management development

From 2011 to 2019, the average proportion of China's tourism industry in foreign trade reached 38.13%, making it the largest foreign service trade in China [130]. However, in 2020, due to the COVID-19, the tourism industry suffered a severe blow, with the import and export of the tourism industry decreasing by 48.2% compared to the previous year. Despite this, the proportion still reached 22.3%, second only to transportation services at 22.9%, ranking second in the tourism service industry. This section will first review the status of China's tourism industry since the founding of the People's Republic of China, as well as the import and export of China's tourism industry. It will then analyze the number and source of inbound tourists, and finally, analyze China's international tourism income and its structure.

After the 1990s, the Chinese government made the development of tourism a clear industrial policy, defining the development status of tourism in the national economy and providing strong support for its development. In terms of export volume, as shown in Figure 2.1, except for the impact of SARS in 2003 and the global financial crisis in 2009, China's tourism export volume maintained positive growth before 2013, increasing from $4.668 billion in 1993 to $51.64 billion in 2013. After 2013, the growth rate of China's tourism service exports slowed down and began to show negative growth, with the exception of a small increase in 2016 and 2018, which lasted for a short time. In 2020, due to COVID-19, China's tourism industry suffered a severe blow, with export volume dropping to $17.071 billion, a year-on-year decrease of 50.34%[131].

Firstly, the development of social economy has laid the material foundation for the development of tourism industry. With the progress of social productivity, the country's social wealth has increased sharply, the average social income has generally risen, and people's living standards have been greatly improved, which has

laid a solid material foundation for many people to travel.

Secondly, the accelerated process of urbanization has changed people's way of life. In the process of urbanization, people's pace of life is getting faster and faster, and the work pressure is getting heavier and heavier, which makes people have a strong demand for holidays to get the opportunity to adjust. At the same time, the progress of science and technology, the continuous improvement of labor productivity, so that people have more leisure time, but also for people to travel to create time conditions.

Thirdly, the development of transportation industry provides necessary conditions for the emergence and development of tourism. Transportation is a necessary condition for travel. At the end of the 19th century and the beginning of the 20th century, with the continuous extension of the railway network in developed countries, as well as the continuous development of the automobile industry, especially the emergence of commercial aircraft in the 1920s, and the development of civil aviation, the tourism industry in the modern sense really began to flourish.

Figure 2.1 Tourism industry Export

Data sources: Guoyan web database (https://data.drcnet.com.cn/)

Regarding import volume, with the continuous increase in China's economic strength and per capita disposable income, there has been a significant increase in

demand for overseas travel, study abroad, shopping, visiting relatives and other activities, leading to a explosive growth in China's tourism import volume. From 2004 to 2019, it increased from $21.859 to $250.84 billion, an increase of 1053.15%. China became the world's largest source of outbound tourists in 2012, and the world's largest tourism outbound spending country in 2013. As shown in Figure 2.2, since 2002, China's tourism import volume has shown a fast overall growth, with a growth rate of 23.77% even during the financial crisis, which reflects to some extent that China was less affected by the financial crisis and people still had money to travel abroad.

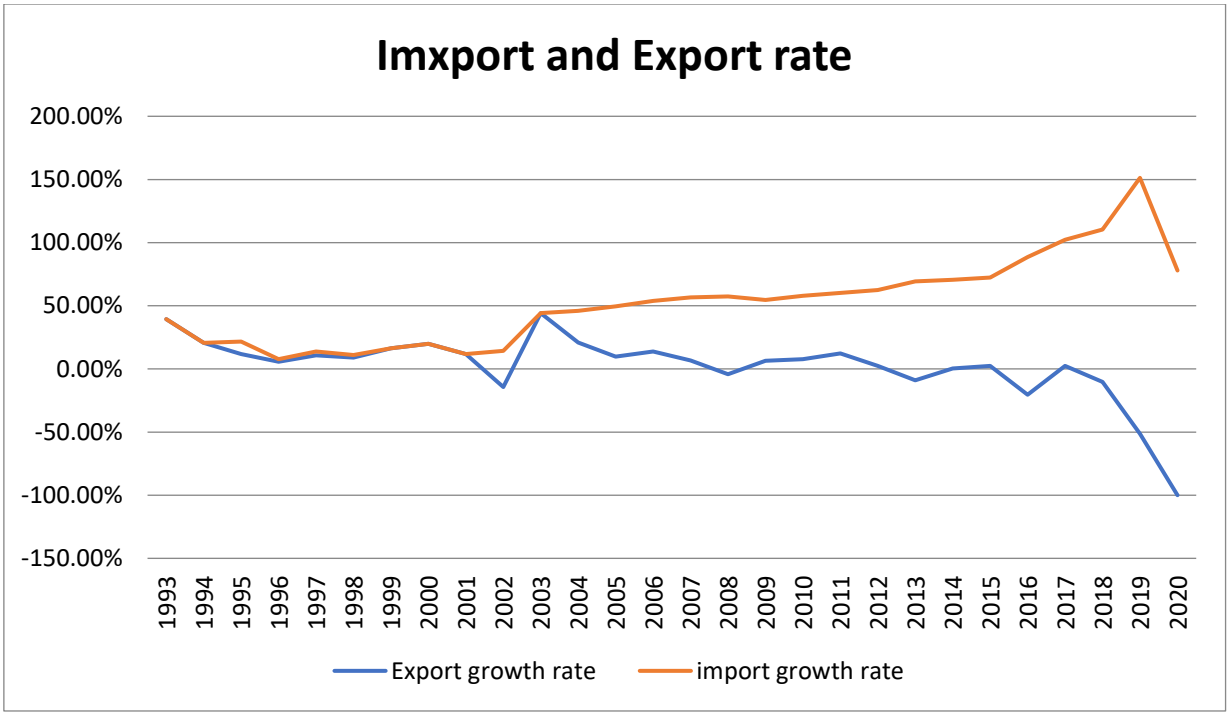

Figure 2.2: Export Growth rate

Data sources: Guoyan web database (https://data.drcnet.com.cn/)

Since 2003, the growth rate of China's tourism import volume has been greater than that of its export, leading to a gradual shift from a tourism surplus to a tourism deficit, which has continued to widen. As shown in Figure 2.3, China's tourism surplus turned into a deficit in 2010, with a deficit of $4.127 billion, and has been expanding ever since, reaching a deficit of $236.282 billion in 2018. In 2020, due to the impact of the COVID-19, China's tourism industry shrank significantly, with exports falling by 50.57% to $17.067 billion and imports falling by 47.66% to

$131.228 billion. As a result, the tourism service trade deficit narrowed to $14.161 billion, but the deficit remained.

The large tourism service trade deficit in China reflects to some extent the difference in the level of development between the domestic and international tourism markets. China's tourism products have low competitiveness and lagging service levels. However, the deficit in China's tourism service trade is not as severe as the figures suggest. Looking at the outbound tourism destinations, in 2020, China had 27 million outbound tourist trips, with Asia as the top destination, accounting for 95.45% of all intercontinental destinations. Hong Kong and Macao accounted for 80% of these trips.

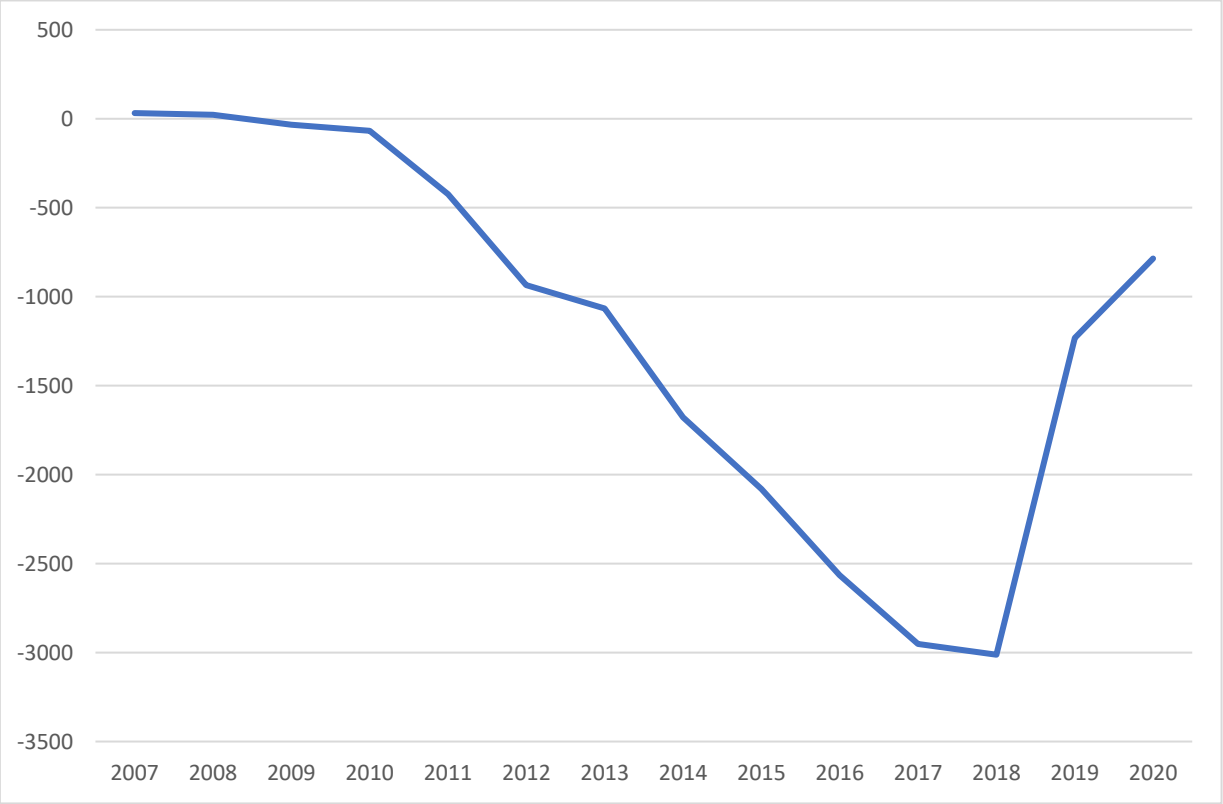

Figure 2.3 - Tourism service trade export

Data sources: Guoyan web database (https://data.drcnet.com.cn/)

The top three outbound destinations in 2020 were Cambodia, Thailand, and Vietnam, which is a result of the "closer economic and trade relations" established by China with these countries and regions, meeting the needs of national strategic development. In terms of the composition of the trade deficit, it mainly comes from overseas consumption. With the continuous increase of per capita income and the

growth of the wealthy population in China, the pursuit of consumption upgrades and international fashion has become increasingly common. Procurement service becomes a must-have option for many tourists. Chinese outbound tourists' consumption is characterized by show-off and differentiation, and their interest in shopping often exceeds that of visiting tourist attractions. Chinese tourists' significant and widespread spending while traveling abroad has had an impact on the global market trends for cosmetics, luxury goods, and gold jewelry. The overwhelming demand for overseas shopping has triggered a market driving mechanism. The duty-free shops on Hainan Island have achieved good results, with duty-free sales reaching 38.92 billion yuan in 2021, and sales in January-February alone exceeding the total sales in 2011.

Firstly, an analysis of the number of inbound tourists is conducted, followed by a study of the sources of inbound tourism, then the study of inbound tourism destinations, and research on China's international tourism revenue and structure.

Looking at the number of inbound tourists, the number of inbound tourists has grown from 88.5 million in 2001 to 146.7 million in 2019, an increase of 164.1%. However, the average annual growth rate is only 2.9%, indicating a slow growth rate. In 2020, due to the outbreak of the COVID-19 pandemic, the Chinese inbound tourism market experienced a depression that had never been seen since the reform and opening-up. According to the World Tourism Organization's statistics, the total number of global tourist arrivals decreased by 74.9% compared to 2019. As of December 2021, due to China's travel restrictions remaining "completely closed," the number of inbound tourists to China in 2020 decreased to 27.469 million, a year-on-year decrease of 82.1%. In 2020, 60% of China's inbound tourists came from Macau, mainly because China opened its borders to Macau in August 2020, allowing tourists who meet the epidemic prevention requirements to enter, which led to a decrease of only 20.9% in Macau's inbound tourists compared to 2019. This to some extent indicates that when the global epidemic is effectively controlled and China gradually lifts its travel restrictions, inbound tourism will quickly recover. However, the current prospects are not optimistic. In 2021, only tourism in South Asia and the

Caribbean has recovered to the same level as in 2019, while other regions have not shown any improvement. The uneven vaccine coverage around the world, the Western countries' "herd immunity" policy, and the continuous evolution of the virus all make the recovery of international tourism uncertain.

Looking at the sources of inbound tourists, with China's increasing openness to the world, as shown in Figure 2.4, the number of inbound tourists has increased year by year, from 11.23 million in 2001 to 31.88 million in 2019, an increase of 283.8%. The proportion has also increased from 13.61% in 2001 to 22.87% in 2019, but the proportion is still relatively low.

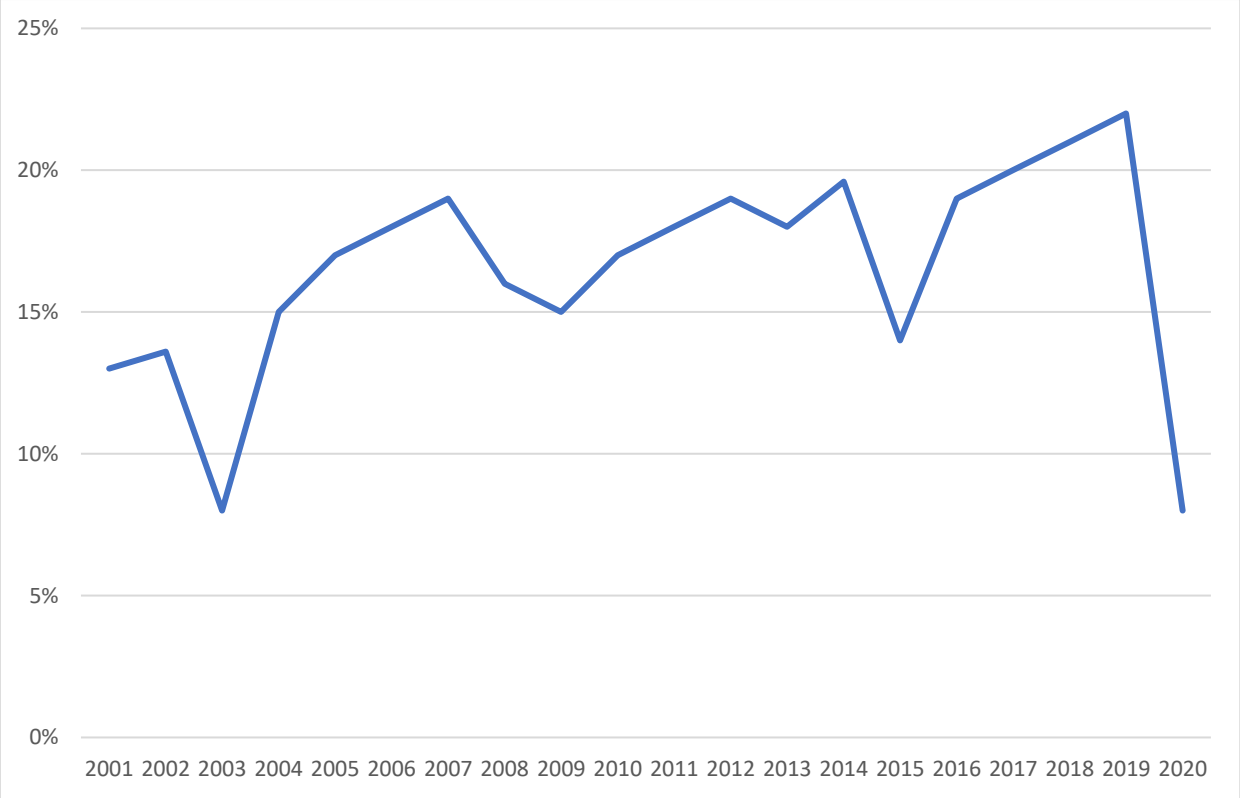

Figure 2.4 - Proportion foreign tourists

Data source: China Statistical Yearbook 2020

According to the sources of foreign tourists, the top five countries and regions are Myanmar, Vietnam, South Korea, Russia, and Japan, accounting for 24.9%, 17.1%, 7.9%, 5.4%, and 5.2%, respectively. It can be found that the top five, except for Russia, are all from Asia, which is partly due to the geographical and cultural distances. As shown in Figure 2.5, nearly 60% of foreign tourists come from Asian countries, mainly from countries that have close economic and political relations

with China or are adjacent to China, such as Japan, South Korea, Vietnam, and Myanmar. Europe and the Americas account for about 30%, while other countries account for about 10%. This indicates that China's tourism industry has a relatively weak appeal to countries outside of Asia, and the source of tourists is relatively single, lacking competitiveness [46, 132-134].

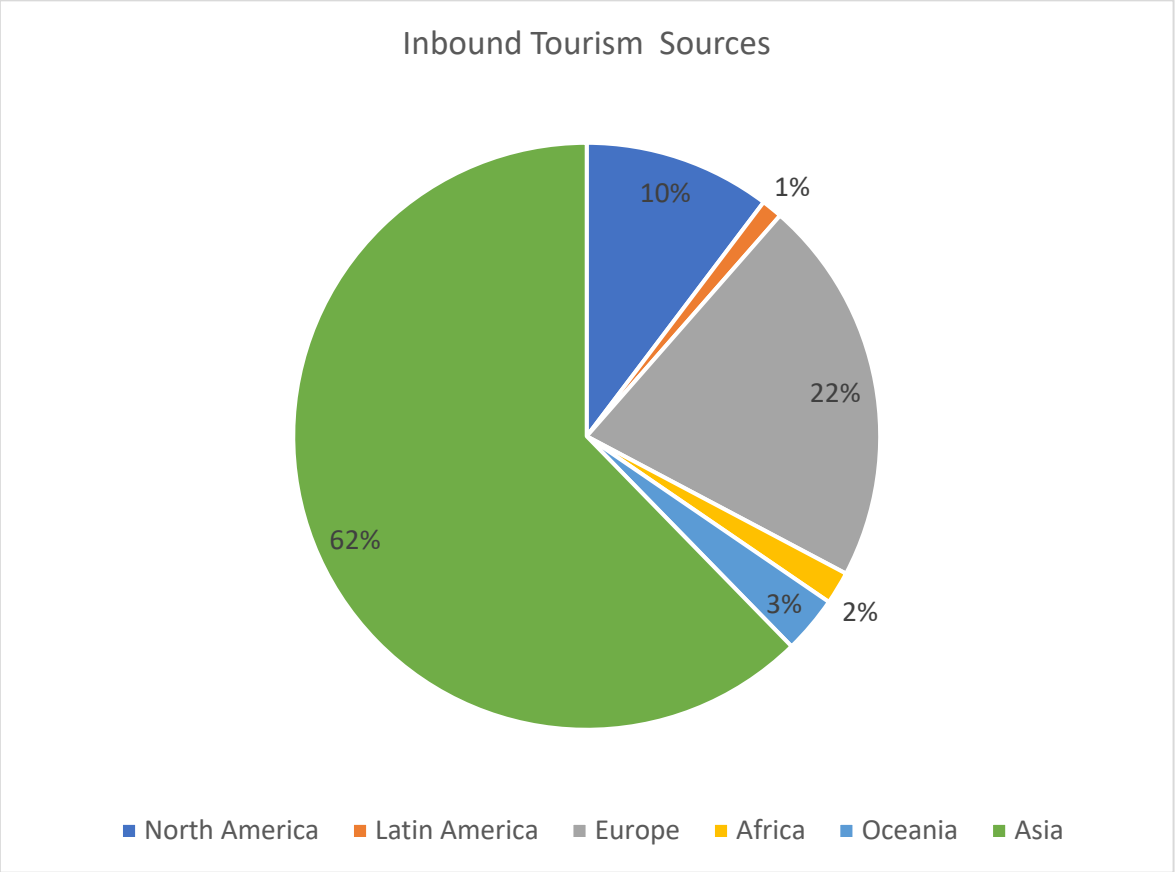

Figure 2.5 - China's inbound tourism Sources of foreign tourists in 2019

Data source: China Statistical Yearbook 2020

From the perspective of inbound tourism destinations, the imbalance in regional tourism in China is still significant, with a situation of "strong in the east, weak in the west, strong in the south, weak in the north, and strong in coastal areas, weak in inland areas". According to Figure 2.6 and Figure 2.7, it can be seen that both in terms of the number of foreign visitors received and foreign exchange earnings, the southeast coastal areas are the main destinations. In terms of foreign exchange earnings, in 2019, the top 10 provinces in China accounted for 73.75% of the total earnings, with an income of $61.036 billion, of which the eastern region earned $49.1 billion, while the western region earned only $12.106 billion. This situation is

also reflected in domestic tourism. According to the "2021 Annual Report on the Development of China's Domestic Tourism ", the eastern region accounted for 51.5% of the domestic tourist source market, followed by the western region at 27.4%, the central region at 18.9%, and the northeastern region at only 2.09%.

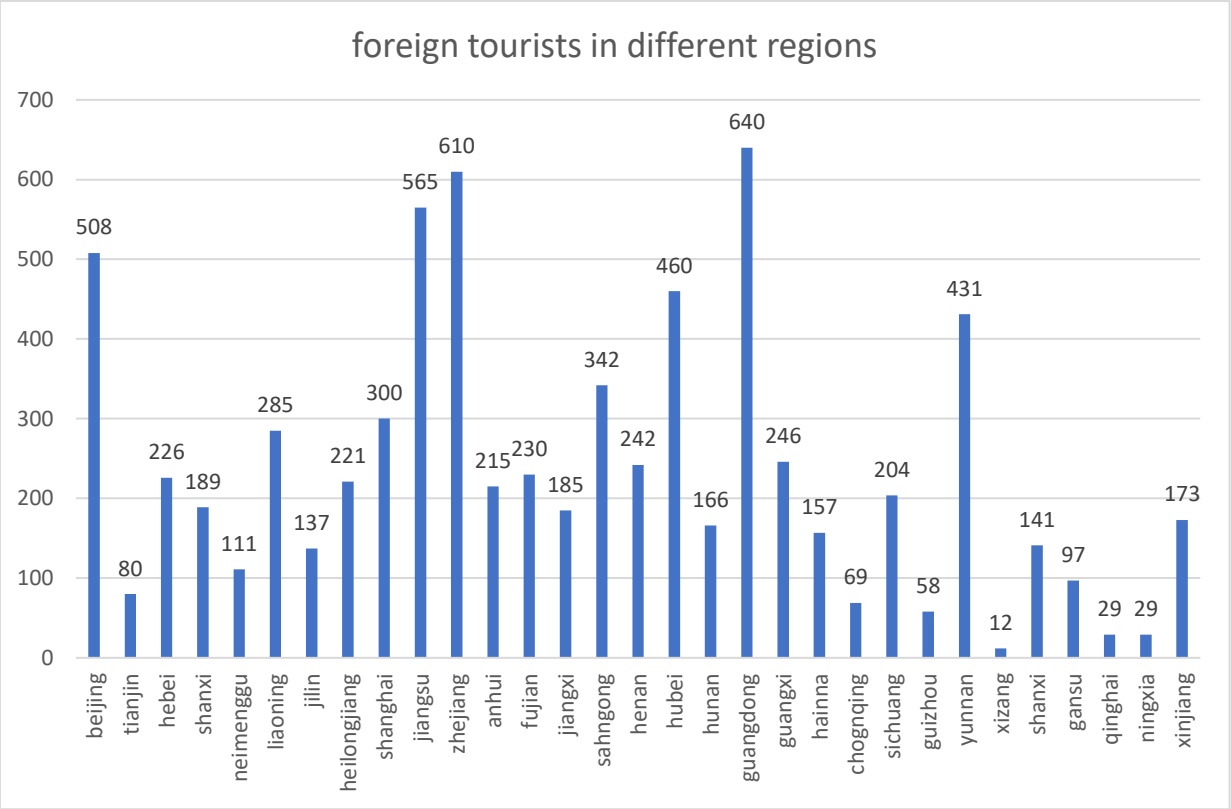

Figure 2.6 - Foreign Tourists

Data source: China Statistical Yearbook 2020

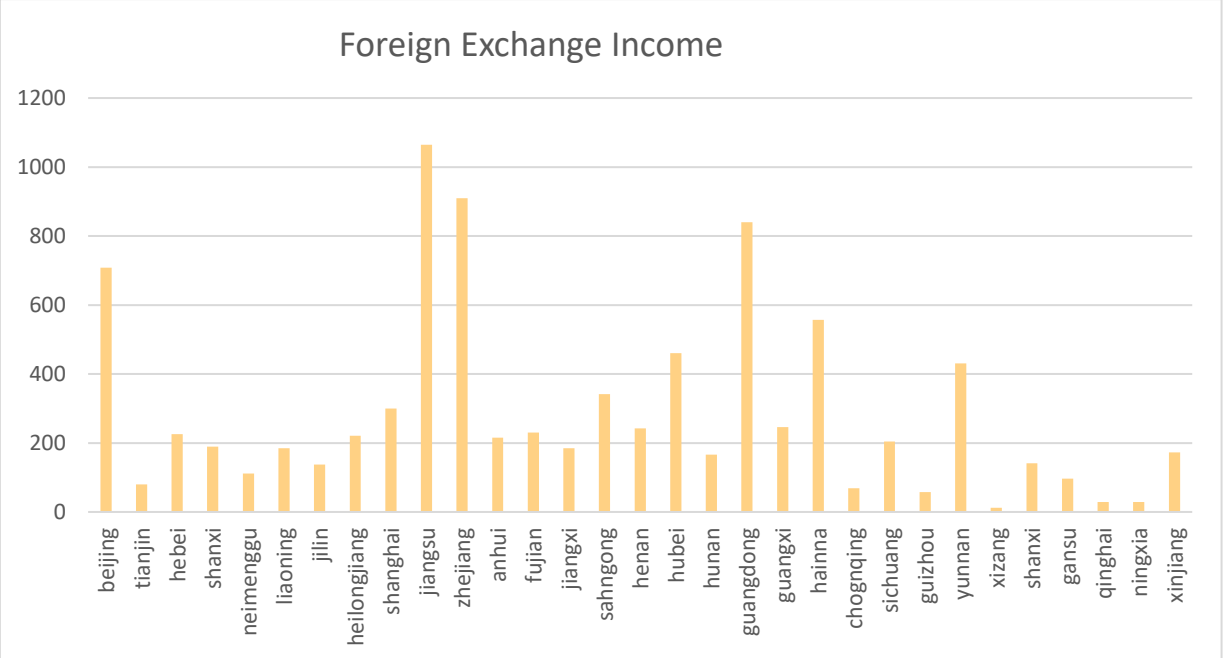

Figure 2.7 - Foreign Exchange Income

Data source: China Statistical Yearbook 2020

4) Inbound tourism revenue and composition of China's tourism industry

Since the beginning of the 21st century, China's foreign exchange earnings from inbound tourism have been on the rise, as shown in Figure 2.8. From 1996 to 2019, China's foreign exchange earnings from inbound tourism increased from $ 6.482 billion to $121.954 billion, with only two years of decline in 2003 and 2008-2009. The decline in 2003 was due to the impact of SARS, and the decline in 2008-2009 was due to the global financial crisis and economic recession, which led to a significant decrease in the number of inbound tourists and a decrease in foreign exchange earnings. However, with the global economic recovery, the tourism industry has experienced rapid development, and China's foreign exchange earnings from inbound tourism have increased rapidly, especially in 2019, with a growth rate of 103.97%, showing a leap in growth. Over the 25 years from 1993 to 2019, its average annual growth rate was 13.78%, higher than the average annual GDP growth rate of 12.48% during the same period, indicating the rapid growth of China's foreign exchange earnings from inbound tourism.

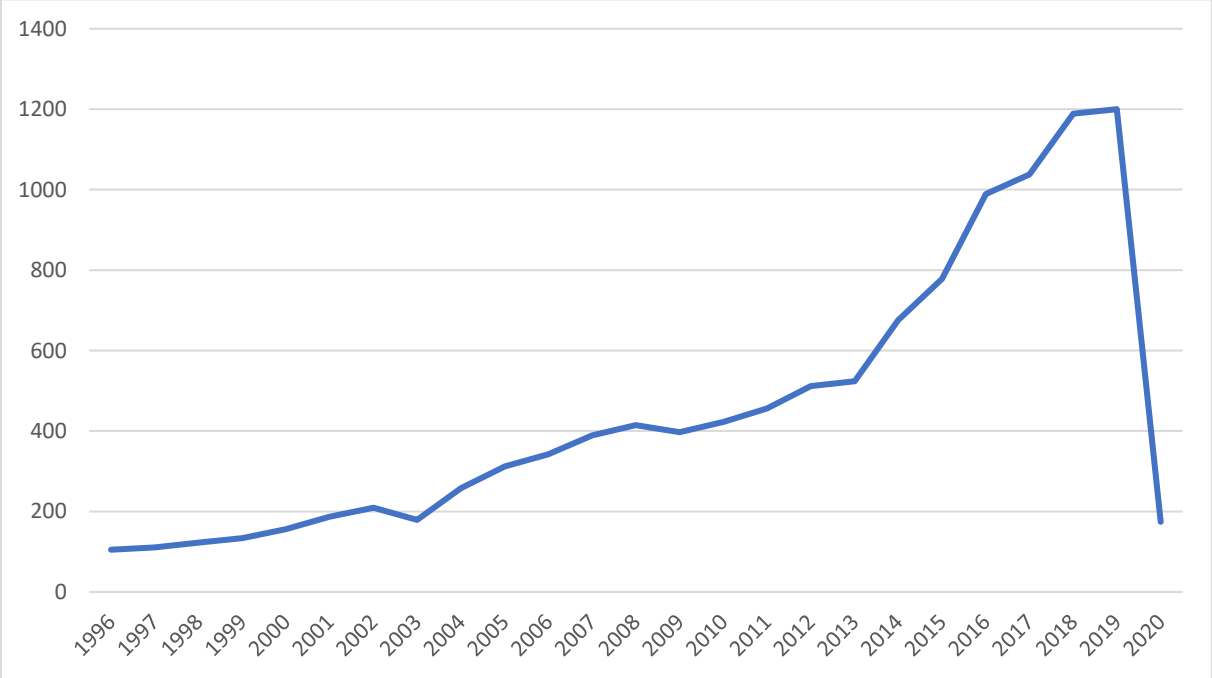

Figure 2.8 - Tourism income

Data source: China Statistical Yearbook 2020

Looking at the structure of China's inbound tourism revenue in 2019, as shown in Figure 2.9, the largest proportion is long-distance travel transportation, accounting for as much as 33%. This indicates that the development of transportation is crucial for the tourism industry. For example, the northwest region of China has abundant tourism resources, but due to the lack of convenient transportation, its tourism industry is still weaker than that of the eastern region. Currently, China has the world's second largest air transport capacity and the longest high-speed rail network, providing convenience for the tourism industry.

However, there are still some deficiencies in ports and roads, which require more investment. The second largest proportion is related to food and accommodation, accounting for 29%. This part is essential travel consumption, with low elasticity and limited growth potential. Finally, the consumption of sightseeing and entertainment, which truly reflects the essence of tourism, accounts for a small proportion of only 3% and 6%, respectively. This reflects the current unreasonable consumption structure of China's inbound tourism and the overall low added value of China's tourism products.

China's development of outbound tourism started relatively late. Prior to 1997, outbound tourism was limited to visiting relatives in Hong Kong, Macau, and Taiwan, and there was little development in outbound tourism. With the continuous strengthening of China's economic strength and the increasing wealth of its citizens, the State Council issued the "Interim Measures for the Administration of Chinese Citizens' Outbound Tourism for Personal Reasons" in 1997, officially started China's outbound tourism.

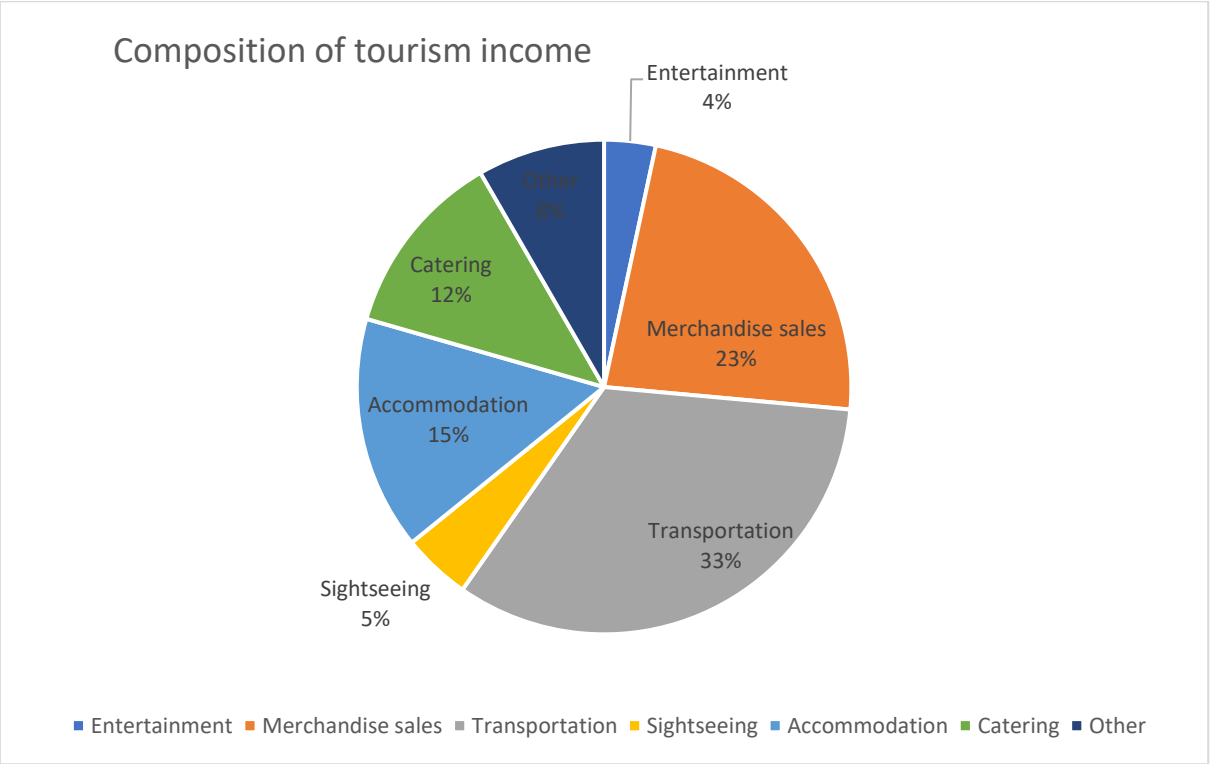

Figure 2.9 - Composition of tourism income

Data source: China Statistical Yearbook 2020

From Figure 2.10, we can see that the number of outbound tourists from China has exploded since 1998. Outbound tourism, which had been suppressed for a long time, was released, and the number of outbound tourists increased from 8.4256 million in 1998 to 159.63 million in 2019. Furthermore, the number of outbound tourists has maintained a growth trend during these 21 years, with an average annual growth rate of 16%, which is much higher than the global average annual growth rate of 5%. This rapid growth is attributed to the increasing wealth of Chinese citizens, changes in their ideological values, the emergence of China's middle class, simplified visa procedures for destination countries, and travel regulations. Although China's outbound tourism numbers are large, ranking second in the world in 2019 after the United States (179.3 million people), the relative numbers are lower. For example, in 2019, the number of outbound tourists accounted for only 12.57% of the total population, while the corresponding figure was 52.11% for the United States, 41.372% for Taiwan in 2011, and about 10.8% for South Africa. However, due to the outbreak of the COVID-19 in 2020, outbound tourism suffered a severe blow.

The number of outbound tourists fell from 154.7235 million in 2019 to 20.278 million in 2020, a year-on-year decrease of 87.03%. In 2021, the number of outbound tourists from China was 25.623 million, a year-on-year increase of 26.1%, but only 16.83% of the number in 2019. China's outbound tourism is basically stagnant. According to the latest survey, COVID-19 has greatly changed people's travel preferences, with short tour becoming the preferred option for Chinese tourists. Furthermore, with current restrictions on outbound and inbound tourism in China, it is difficult for China's outbound tourism to recover quickly in the short term.

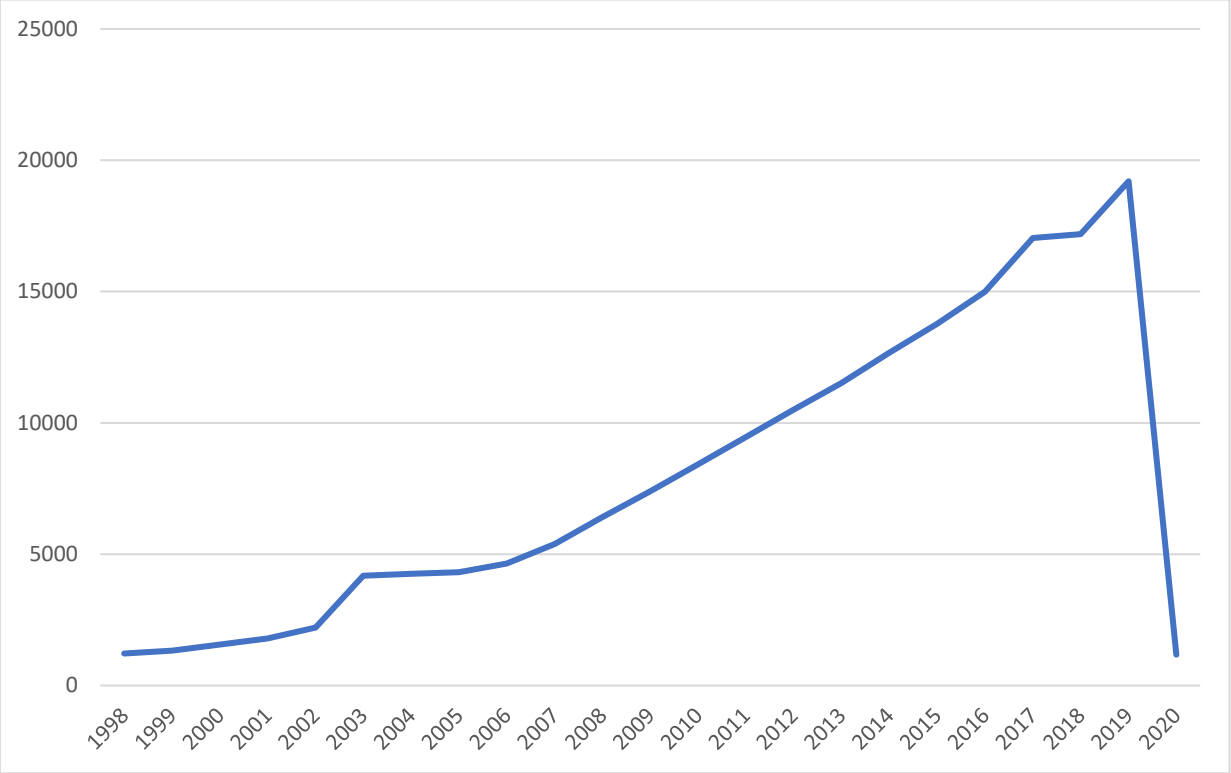

Figure 2.10 - Number of outbound tourists

Data source: China Statistical Yearbook 2020

From the perspective of the structure of outbound tourism destinations, Hong Kong, Macao, and Taiwan remain the top choices for Chinese residents traveling abroad, accounting for over 80% of the market share. This makes Asia the most popular destination region, accounting for 95% of all outbound tourism destinations, followed by Europe, the Americas, Oceania, and Africa, with similar market shares. Among the Asian outbound destinations, China has closer ties with neighboring countries such as Vietnam, South Korea, and Japan, but lacks communication with

Central Asia and South Asia.

China has put forward the development of "smart tourism" and other proposals, which have spurred the transformation of the tourism industry. The digitalization of tourism has gone through four stages: the germination era, the preparation era, the development era, and the acceleration era. In 1990, the National Tourism Administration established the Tourism Information Center and actively carried out the construction of tourism information networks and data centers. In 1994, the National Tourism Administration Information Center was officially established. During this phase, technologies such as the Internet and multimedia were used as core technical supports, and computer technology was applied to the entire process of research and development, production, and sales, opening the digital era of tourism. In 1997, the National Tourism Administration established ct.cn, which categorized and displayed information related to China's tourism, promoting destinations and travel information globally. The establishment of Ctrip and Elong in 1999 marked the establishment of China's online travel platforms. Many online travel platforms were born in 2003, laying a solid foundation for the start of digitalization in tourism. In 2011, modern information technology was encouraged to be widely applied in the tourism industry, and the development of e-commerce and online tourism was encouraged to achieve the transformation of the tourism industry to modern service industry. Cities with conditions were supported to develop smart tourism, and the intelligent construction of scenic spots and hotels was promoted. In 2015, there was a call to improve the intelligence of tourism services, management, marketing, and experience, and to promote the development of smart tourism. In August 2019, the convening of the Digital Cultural and Tourism Integration Innovation Development Conference marked the arrival of China's digital cultural and tourism era[135].

In terms of tourism scale, in 2009, the scale of China's online tourism market was only 61.76 billion yuan, and by 2019, it had reached 989.56 billion yuan. Over the past decade, the transaction scale of China's online tourism market has continued to grow, but the growth rate has slowed down. As of June 2022, the user scale of

China's online tourism has dropped to 333 million, a decrease from December 2021[136].

The method adopted in this paper is to use VAR model to establish a framework for the analysis of the two. The VAR model is established for the relationship between China's economic growth and the development of tourism industry. The general form is as follows:

$$y_{t=} \sum_{t=1}^{k} A_i Y_{t-1} + \varepsilon_t \quad 2.1$$

Wherein, Y_t=（LNGDP, LNTR）, k is the lag order of the model, A_i is the coefficient matrix to be estimated, Y_{t-1} is the i-order lag variable of Y_i vector, and ε_t is the error term, which can be regarded as random interference term in this model.

To eliminate the false regression phenomenon in the regression of non-stationary data, the stationarity test of the data is carried out first. Unit root test is a common and accurate method to test the stability of data by using statistics.

In this paper, using Stata15, ADF (Augmented Dickey-Fuller) unit root test method to test the stability of variables GDP and TR. The data in the study were taken as the natural logarithm of all variables, i.e., ln GDP and LNTR. The purpose of this approach is mainly because the original data is too large and the statistical caliber of different data is inconsistent. Taking logarithm for empirical test can reduce the influence of the original data error on the result to a certain extent. The test results are shown as follows.

The variables of unit root test results:

```
Dickey-Fuller test for unit root                   Number of obs   =        17

                                 ------------ Interpolated Dickey-Fuller ------------
                 Test            1% Critical       5% Critical      10% Critical
               Statistic            Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -4.409            -3.750            -3.000           -2.630
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.0003

.
```

Dickey-Fuller test for unit root — Number of obs = 18

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-4.787	-3.750	-3.000	-2.630

MacKinnon approximate p-value for Z(t) = 0.0001

As can be seen from the ADF test results above, the above two variables are non-stationary variables. After the second-order and first-order difference processing, the hypothesis of the existence of a unit root is rejected, that is, they become stationary variables. One of the two variables is a first-order simple integral and the other is a second-order simple integral. There may be some kind of stable relationship between them.

Since lnGDP and LNTR are both integral sequences, they meet the precondition of co-integration test. Pedrion co-integration test is a test method based on vector autoregression (VAR) model, so the structure of VAR model must be determined before the co-integration test. In order to maintain a reasonable degree of freedom that the parameters of the model has strong explanatory, at the same time, in order to eliminate autocorrelation of error term, so choose to AIC criterion, the rule of SC and LR statistic as choosing the optimal lag order inspection standards, and verify the VAR model of residual whether to obey the normal independent identical distribution, finally established for cointegration test VAR model lag order to 2.

From the above test results, the characteristic root test and the maximum eigenvalue test of the co-integration test, it can be seen that P is 0 significantly rejects the existence of the co-integration relation of the null hypothesis.

The test results are shown as follows:

```
. xtcointtest pedroni D2.lngdp D.lntr

Pedroni test for cointegration
------------------------------------------------------------------------------
Ho: No cointegration                        Number of panels       =      1
Ha: All panels are cointegrated             Number of periods      =     17

Cointegrating vector: Panel specific
Panel means:          Included              Kernel:           Bartlett
Time trend:           Not included          Lags:             2.00 (Newey-West)
AR parameter:         Panel specific        Augmented lags:   1
------------------------------------------------------------------------------
                                            Statistic         p-value
------------------------------------------------------------------------------
 Modified Phillips-Perron t                  -0.7836          0.2166
 Phillips-Perron t                           -4.0806          0.0000
 Augmented Dickey-Fuller t                   -4.0461          0.0000
------------------------------------------------------------------------------
```

The long-term stable co-integration relationship among variables is the basis of establishing vector white regression (VAR) model. Through the above results, it can be found that from 2000 to 2019, there is a long-term and stable co-integration relationship between the development of China's tourism industry and economic growth. In order to further explore the relationship between the two, tourism income (TR) and GDP reflecting economic growth are regarded as endogenous variables, and the VAR model is established after taking the natural logarithm to estimate the dynamic relationship between them. Vectors autoregressive model is similar to simultaneous equation model. Its biggest feature is that it does not need to determine in advance which variables are endogenous variables and which variables are exogenous variables. It eliminates the influence of human subjectivity and analyzes all variables as endogenous variables.

Based on the selected variables LNGDP and LNTR, a 2-dimensional vector autoregressive model can be constructed. First, determining the optimal lag order of the VAR model can eliminate the autocorrelation existing in the residual error and improve the effectiveness of the model parameter estimation. The following results give the LR, FPE (final prediction error criterion), AIC (Akakike information criterion) and SC (Schwartz) criteria of 0-7 order VAR model to determine the lag order. The results are as follows, so it can be determined that the lag order of the vector autoregressive model is 2 periods.

```
. varsoc lngdp lntr,maxlag(7)

Selection-order criteria
Sample:  2007 - 2019                              Number of obs      =        13
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	10.4011				.000942	-1.29248	-1.31034	-1.20556
1	49.3019	77.802	4	0.000	4.5e-06*	-6.66183	-6.71543	-6.40109
2	50.1534	1.7029	4	0.790	7.7e-06	-6.17744	-6.26677	-5.74286
3	56.0622	11.818	4	0.019	6.8e-06	-6.47111	-6.59616	-5.8627
4	59.7069	7.2895	4	0.121	.000011	-6.41645	-6.57724	-5.63422
5	64.1684	8.9229	4	0.063	.000025	-6.48744	-6.68396	-5.53138
6	731.251	1334.2	4	0.000	.	-108.5	-108.732	-107.37
7	788.546	114.59*	4	0.000	.	-117.315*	-117.547*	-116.185*

```
Endogenous:  lngdp lntr
 Exogenous:  _cons

Vector autoregression

Sample:  2001 - 2019                              Number of obs      =         19
Log likelihood =   61.51738                       AIC                =  -5.843935
FPE            =   9.99e-06                       HQIC               =   -5.79346
Det(Sigma_ml)  =   5.28e-06                       SBIC               =  -5.545691
```

Equation	Parms	RMSE	R-sq	chi2	P>chi2
lngdp	3	.033144	0.9981	10037.18	0.0000
lntr	3	.085462	0.9922	2404.968	0.0000

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
lngdp						
lngdp L1.	1.151465	.0622838	18.49	0.000	1.029391	1.273539
lntr L1.	-.1445592	.0507932	-2.85	0.004	-.244112	-.0450064
_cons	-.4132431	.3180677	-1.30	0.194	-1.036644	.2101581
lntr						
lngdp L1.	.5099904	.1606001	3.18	0.001	.1952201	.8247608
lntr L1.	.592533	.1309712	4.52	0.000	.3358342	.8492318
_cons	-2.415559	.8201437	-2.95	0.003	-4.023011	-.8081067

The VAR model equation is as follows:

$$\ln GDP = \ln GDP - 1 + \ln TR - 1$$

The empirical results show that the total fitting degree of the model is 0.99, and the mutual influence between the two variables can be seen from the above equation.

(1) When the lag order is the first order, the influence coefficient of the economic growth variable on itself is positive, and the influence coefficient of the

total tourism revenue on the economic growth variable is negative. When the lag order is second order, the influence coefficient of the economic growth variable on itself is negative, and the influence coefficient of the total tourism income variable on the economic growth variable is positive. That is to say, the increase in tourism income does not have an immediate positive effect on economic growth, but this positive effect will be reflected in the long run. The economic growth has an immediate impact on its own, but in the short term there will be certain fluctuations, affecting its own growth. In terms of the overall coefficient, the influence coefficient is positive, that is, China's economic growth has been positively promoted under the influence of tourism development and economic growth.

(2) As shown above, when the lag order is the first order, the impact coefficients of economic growth variable and tourism income variable on the income of the entire tourism industry are both positive; The lag order number for the second order, and tourism revenue to its negative influence coefficient, economic rights long still positive impact on the tourism income, it can be seen that in the short term, economic rights and tourism income effect on its own is a positive, after a period of time, the tourism income creates a weak negative effect on its own will, but from the point of integral coefficient, the total influence coefficient is positive, that is, from the long-term drinking in the short term, tourism development and economic growth of China's overall tourism industry has a promoting effect.

After the establishment of the VAR model, the stationarity test is required. If the stationarity test cannot be passed, the conclusion drawn by the model may be invalid, and further analysis of the impulse response function and variance decomposition cannot be carried out on the model.

The following results give the results of the VAR model's stationarity test. No characteristic root is outside the unit circle, that is, the model is stable.

```
Prais-Winsten AR(1) regression -- iterated estimates

      Source |       SS           df       MS      Number of obs   =        20
-------------+----------------------------------   F(2, 17)        =   1750.17
       Model |  17.8775037         2  8.93875183   Prob > F        =    0.0000
    Residual |  .086825284        17   .00510737   R-squared       =    0.9952
-------------+----------------------------------   Adj R-squared   =    0.9946
       Total |  17.9643289        19  .945490997   Root MSE        =    .07147

------------------------------------------------------------------------------
       LNGDP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
       LNTRw |   .0158121   .1055009     0.15   0.883    -.2067754    .2383996
       LNTRn |   .7137285   .0865976     8.24   0.000     .5310236    .8964334
       _cons |   5.876353   .4632402    12.69   0.000     4.899001    6.853704
-------------+----------------------------------------------------------------
         rho |   .7775873
------------------------------------------------------------------------------
Durbin-Watson statistic (original)    0.383572
Durbin-Watson statistic (transformed) 1.831212
```

Granger causality test is based on some assumption conditions and important method used to study the cause and effect relationship, if the contains a variable Y, and X past information conditions, the prediction effect of variable Y is superior to separate only by Y past information to the prediction effect of Y, namely, if the variable X help to explain the change in the future, of variable Y is considered variable X is the granger cause of the variable Y. AR model has been established for the two variables of tourism industry income and economic growth, which can indicate that there is a certain stable relationship between the two variables, but the causality of the two variables cannot be determined. Therefore, to avoid false causality, the Granger causality test of the two sets of data is carried out by using the Stata 15. The test results are shown as follows.

```
. xtgcause lngdp lntr,lag(2)


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------------
Lag order: 2
W-bar =          1.4455
Z-bar =         -0.2773    (p-value = 0.7816)
Z-bar tilde =   -0.3232    (p-value = 0.7465)
------------------------------------------------------------------
H0: lntr does not Granger-cause lngdp.
H1: lntr does Granger-cause lngdp for at least one panelvar (id).
```

```
. xtgcause lntr lngdp,lag(2)


Dumitrescu & Hurlin (2012) Granger non-causality test results:
------------------------------------------------------------
Lag order: 2
W-bar =          8.0635
Z-bar =          3.0318    (p-value = 0.0024)
Z-bar tilde =    2.0065    (p-value = 0.0448)
------------------------------------------------------------
H0: lngdp does not Granger-cause lntr.
H1: lngdp does Granger-cause lntr for at least one panelvar (id).
```

As can be seen from the above test results, there is a two-way causality between LNGDP and LNTFI, that is, in China's economic system, the development of tourism industry and economic growth are mutually causal.LNGDP is the Granger cause of LNTFI, and it can be seen from Akike criterion that the second phase should be delayed.

In the VAR model, a single coefficient of each only reflects a local relationship and cannot capture a comprehensive and complex dynamic process. Granger test also only discusses the existence of causality between variables from the perspective of statistics. However, the impulse response function related to the VAR model can comprehensively reflect the dynamic relationship among various variables. The impact of one standard deviation information on another variable of random perturbation term is analyzed. However, the premise is that the VAR model is stable. It can be seen from the above unit root test results that the constructed VAR model is stable. Therefore, the impulse response function can be selected to analyze the dynamic relationship between the variables LNGDP and LNFI.

Figure 2.11 shows the analysis results of the impulse response function of the VAR (2) model. The vertical axis represents the response value, and the horizontal axis represents the number of lag periods.

The analysis results of impulse response can be seen from the figure as follows: (1) The variable LNTR immediately showed a positive response to the positive impact of one unit of itself, and the response continued to grow steadily, reaching the maximum at the seventh stage.

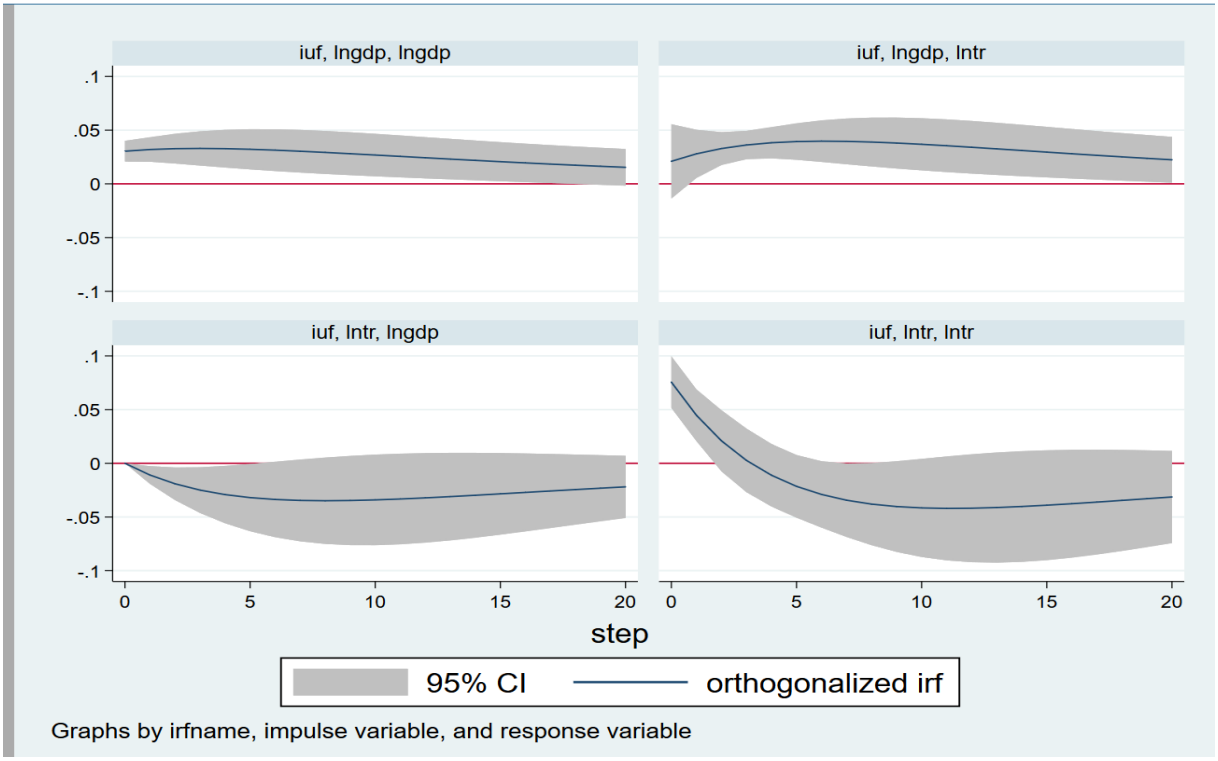

Figure 2.11 - Analysis results of the impulse response function of the VAR model

It shows that in the long and short term, the increase of tourism income has an obvious long-term and stable promotion effect on itself, but its growth rate decreases with the increase of periods. Therefore, in the long term, the increase of tourism income needs multiple factors to maintain the stability of its growth rate.(2) variable LNDGP units of a positive impact, and did not cause variable LNR rapid response, in the second period LNR before reaction, and steady growth, on the seventh period reached the highest growth rate after the slowdown, suggesting that LNTFI for LNGDP shock reaction lag, but once you start, its growth is faster. In general, it can be seen that LNDGP has a long-term and stable promoting effect on the variable LNTR.

As can be seen from the Figure 2.12, (1) the variable LNDGP immediately had a strong response to a positive standard deviation information of its own, and the response was rapid and sustained. It reached the peak in the seventh phase, and then the rate of increase slowed down. This indicates that the positive promoting effect of LNDGP is greater. (2) After the positive impact of one unit of variable TR, the variable LNDGP almost had no response. However, in the second period, the LNDGP began to grow continuously, and reached the highest value in the eighth

period with a small increase, and the growth rate slowed down after the eighth period. This indicates that in the short term, the impact of LNDGP on LNTFI is small, and in the long term, it has a promoting effect, but the positive promoting effect is smaller than the effect of the variable LNDGP itself. In other words, the promoting effect of LNTFI on LNDGP is small and the positive effect of LNDGP on LNR.

Impulse response function can capture the osmosis image path of the impact factor of one variable to another variable, while variance decomposition can decompose the variance of a variable in the VAR system to each disturbance term, so as to evaluate the importance of impact of different structures. The established VAR model was decomposed into variance, and the results are as follows.

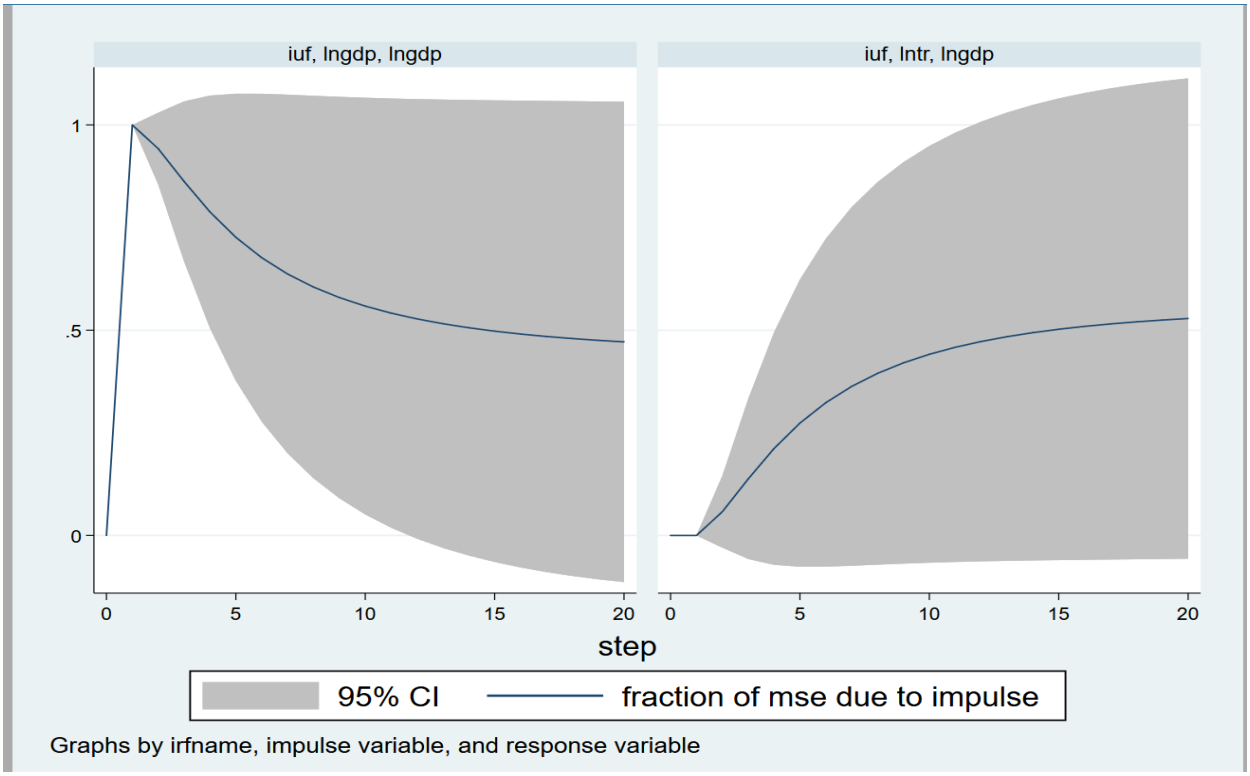

Figure 2.12 - The impact of the development of tourism industry on the economic growth

As can be seen from variance decomposition of LNDGP, the impact of the development of tourism industry on the economic growth in the first period is only 5.11%, and its influence continues to decline until the fourth period. After that, it starts to grow slowly and reaches the highest value in the tenth period, which is 21.07%. This shows that in the short term, the impact of tourism industry on economic growth has been reduced to a certain extent, but in the long run, it still

plays a positive role in promoting economic growth, but the role is not very big. In addition, China's economic growth is largely influenced by itself, which indicates that it is influenced by many other factors.

```
. irf table fevd,r(lngdp)
```

Results from iuf

step	(1) fevd	(1) Lower	(1) Upper	(2) fevd	(2) Lower	(2) Upper
0	0	0	0	0	0	0
1	1	1	1	0	0	0
2	.94229	.854737	1.02984	.05771	-.029843	.145263
3	.862443	.667465	1.05742	.137557	-.05742	.332535
4	.788145	.504754	1.07154	.211855	-.071536	.495246
5	.7263	.376442	1.07616	.2737	-.076159	.623558
6	.676586	.277204	1.07597	.323414	-.075968	.722796
7	.636917	.200021	1.07381	.363083	-.073814	.799979
8	.605161	.13919	1.07113	.394839	-.071132	.86081
9	.579555	.090546	1.06856	.420445	-.068563	.909454
10	.558733	.051125	1.06634	.441267	-.066341	.948875
11	.54166	.018809	1.06451	.45834	-.064511	.981191
12	.527552	-.007932	1.06303	.472448	-.063035	1.00793
13	.51581	-.030225	1.06184	.48419	-.061845	1.03022
14	.505976	-.048917	1.06087	.494024	-.06087	1.04892
15	.497694	-.064657	1.06004	.502306	-.060045	1.06466
16	.490684	-.07795	1.05932	.509316	-.059317	1.07795
17	.484724	-.089198	1.05865	.515276	-.058646	1.0892
18	.479638	-.098724	1.058	.520362	-.058	1.09872
19	.475282	-.106793	1.05736	.524718	-.057358	1.10679
20	.471541	-.113624	1.05671	.528459	-.056707	1.11362

95% lower and upper bounds reported
(1) irfname = iuf, impulse = lngdp, and response = lngdp
(2) irfname = iuf, impulse = lntr, and response = lngdp

From LNTFI variance decomposition can see, the influence of the economic growth for the tourism industry revenues in the first period is 0, then began to rise year by year, peaked at 10, 36.33 it shows that in the short term, economic growth does not increase the instant impact on tourism revenues, but look from the long-term equilibrium and its positive role is increasing, and economic growth for the rights and the contribution of tourism industry income is greater than the contribution of tourism income increase on economic growth. At the same time, since the first period, the impact of tourism industry's income on itself has slowed down year by year, indicating that the increase of tourism industry's income cannot be improved only by its own development as time goes by. There are more factors affecting the increase of tourism industry's income.

This study is based on tourism revenue, regional GDP data of China's tourism

income and GDP growth correlation analysis, the following conclusions: from the point of the whole city scope, China between LNGDP and LNTR correlation coefficient is 0.99, further analysis of China's tourism income is not the granger cause of GDP growth, GDP is the granger reason of tourism revenue. As an important part of modern service industry, tourism plays a limited role in driving China's economic development. However, the rapid economic development in recent years has provided a basic guarantee for the development of tourism. This leads to the thinking of the development of China's tourism industry in the past 20 years: the government should be inclined to support the development of tourism economy when making decisions, and actively develop the service consumption industry, so as to raise the tourism industry to a new level from the perspective of service and management and promote the driving effect of tourism on the regional economy.

2.2 The evaluation system of China’s tourism industry

The World Economic Forum (WEF) has released two reports, "The Travel & Tourism Competitiveness Report 2019" and "The Travel & Tourism Competitiveness Report 2022," which cover 140 countries and regions around the world. The top ten countries and regions in tourism competitiveness ranking in 2019 were Spain, France, Germany, Japan, the United States, the United Kingdom, Australia, Italy, Canada, and Switzerland. In 2022, they were Japan, the United States, Spain, France, Germany, Switzerland, Australia, the United Kingdom, Singapore, and Italy. China ranked 13th in 2019, with a score of 4.9, which was two places higher than in 2017. The specific ranking for China in 2022 was not provided, but overall, China's unique natural and cultural tourism resources scored very high, with low hotel prices and fewer tourism taxes. The availability of air transportation to China helped to reduce the cost of tourism. However, there is still room for improvement in other areas.

In the tourism service industry, international competitiveness is often measured using relevant indicators. This study selected the international market share of tourism (IMS), the trade competitiveness index (TC), the revealed comparative advantage index (RCA), and the Vollrath's revealed comparative advantage (VRCA) to analyze the international competitiveness of China's tourism industry. Since the United States and China are both major tourism powers with abundant tourism resources, Japan is a major competitor for China, as it is close to China and has a similar culture, and Thailand is a strong Asian tourism country. Spain and Germany are traditional European tourism powerhouses, and Ukraine is a country where the author is familiar with due to studying there[137-139]. Comparing China with these countries can better demonstrate the current international competitiveness of China's tourism industry.

The International Market Share (IMS) refers to the proportion of a country or region's export volume of a product to the total export volume of that product worldwide. This indicator can reflect the competitiveness of a country or region in the international market for that product. The higher the value of the IMS, the more competitive the product is in the international market. This indicator focuses on the scale of trade but cannot eliminate the influence of a country's or region's own size.

See 2-1 for the specific formula:

$$IMS_{ijt} = \frac{X_{ijt}}{X_{wjt}}$$ Formula 2-1

IMS_{ijt} indicates the index of the market share of product *j* of country *i* in time *t*, X_{ijt} indicates the export volume of product *j* of country *i* in time *t*, and X_{wjt} indicates the global export volume of product *j* in time *t*. In this dissertation, product *j* refers to the tourism trade service.

As shown in Table 2.1, in 2015, the international market share of seven countries was over 33.55%, with the highest being the United States, which has maintained its position as the leader and a major tourist destination with an undisputed dominant position. Its international market share was the highest at 15.99%, and other countries still have a long way to go to catch up. Spain is also a

traditional tourism power, having been rated as the world's best tourist destination by the World Economic Forum (WEF) for three consecutive years. Its highest international market share was 7.43%, but it has shown a downward trend in recent years.

Table 2.1 - International Market Share (IMS) in 2005-2021 unit:%

Year	China	American	Japan	Spain	Germany	Thailand	Ukraine
2005	4.19%	13.36%	1.78%	7.43%	4.16%	1.37%	0.45%
2006	4.45%	12.61%	1.11%	7.37%	4.31%	1.76%	0.46%
2007	4.23%	12.14%	1.06%	7.21%	4.10%	1.89%	0.52%
2008	4.22%	12.08%	1.12%	7.11%	4.12%	1.88%	0.60%
2009	4.46%	12.45%	1.16%	6.72%	3.91%	1.80%	0.40%
2010	4.76%	13.53%	1.37%	6.11%	3.60%	2.09%	0.39%
2011	4.50%	13.20%	1.02%	6.26%	3.61%	2.52%	0.40%
2012	4.50%	13.84%	1.31%	5.69%	3.43%	2.76%	0.44%
2013	4.30%	14.22%	1.26%	5.70%	3.43%	3.14%	0.42%
2014	3.52%	14.40%	1.51%	5.72%	3.46%	2.78%	0.13%
2015	3.73%	15.99%	2.07%	5.19%	3.06%	3.42%	0.09%
2016	3.60%	15.64%	2.49%	5.42%	3.04%	3.63%	0.09%
2017	2.92%	14.77%	2.56%	5.66%	3.00%	3.94%	0.09%
2018	2.75%	13.97%	2.93%	5.68%	2.99%	3.92%	0.10%
2019	2.34%	13.49%	3.12%	5.40%	2.83%	4.06%	0.11%
2020	3.08%	13.10%	1.93%	3.34%	3.99%	2.57%	0.06%
2021	1.89%	11.42%	0.78%	5.62%	3.60%	0.78%	0.15%

Source: author´s development

However, aside from the impact of the COVID-19 in 2020, its overall international market share remained above 5% in other years, and it has rebounded to 5.62% in 2021. In comparison to other countries, Thailand and Ukraine have relatively low tourism market shares, with Thailand hovering around 3%, while Ukraine is less than 1%. China's international market share performed well from 2005 to 2013, maintaining around 4%, which was much higher than Japan and even slightly stronger than tourism power like Germany and Thailand. However, since 2014, China's international market share has been on a downward trend, with its

lowest share dropping to 2.34% in 2019, a decrease of nearly 2 percentage points. China has gradually been overtaken by Germany and Thailand, and even surpassed by Japan in 2018-2019. It has returned to 3.08% in 2020, but from 2021 onwards, there have been changes in market shares across countries, with China's decline being more significant. Despite having the world's largest population, the third-largest land area, and the most World Heritage sites, China's market share in tourism is not high, and even somewhat low. It is clearly not commensurate with the resources it possesses, and its competitiveness is weak, which is a big gap compared to leading tourism countries such as the United States.

The Trade Competitiveness (TC) is an important indicator used to measure the international competitiveness of a country or region's products or services. It is calculated by dividing the difference between a country or region's import and export values for a specific product or service by the total value of imports and exports. This index can eliminate macro factors such as price levels and exchange rate differences, as well as the impact of different country and regional sizes, making it comparable across different time periods, countries, and regions. However, when import and export values are close, the index may not accurately reflect a country's international competitiveness. The formula is given as Formula 2-2.

$$TC_{ijt} = \frac{(X_{ijt} - M_{ijt})}{(X_{ijt} + M_{ijt})} \qquad \text{Formula 2-2}$$

TC_{ijt} represents the Trade Competitiveness for product *j* in country *i* during time period *t*, where X_{ijt} and M_{ijt} represent the export and import value for the same product *j* during the same period *t*. The TC index ranges from -1 to 1. A TC index of 1 indicates that a country only exports the product and has a significant advantage in the international market. A TC index of -1 indicates that a country only imports the product and has no competitive advantage. A TC index of 0 indicates that the import value is equal to the export value, indicating a moderate level of competitiveness. Therefore, a TC index closer to 1 indicates a strong competitive advantage, while a TC index closer to -1 indicates a lack of competitive advantage.

Table 2.2 - Trade Competitiveness (TC) of 2005-2020

Year	world	China	American	Spain	Japan	Germany	Thailand	Ukraine
2005	0.03	0.15	0.12	0.55	-0.50	-0.44	0.43	0.05
2006	0.04	0.17	0.10	0.54	-0.52	-0.39	0.49	0.10
2007	0.04	0.11	0.13	0.52	-0.48	-0.39	0.53	0.13
2008	0.05	0.06	0.16	0.54	-0.44	-0.39	0.57	0.18
2009	0.05	-0.05	0.15	0.55	-0.42	-0.40	0.57	0.04
2010	0.05	-0.09	0.21	0.55	-0.36	-0.39	0.56	0.01
2011	0.06	-0.20	0.24	0.59	-0.43	-0.38	0.65	-0.02
2012	0.04	-0.34	0.26	0.61	-0.31	-0.37	0.66	-0.03
2013	0.05	-0.43	0.30	0.61	-0.18	-0.38	0.71	-0.06
2014	0.00	-0.68	0.30	0.60	-0.01	-0.37	0.66	-0.52
2015	0.01	-0.69	0.30	0.56	0.22	-0.35	0.68	-0.65
2016	0.01	-0.71	0.28	0.56	0.25	-0.36	0.66	-0.69
2017	0.01	-0.74	0.25	0.55	0.30	-0.38	0.67	-0.70
2018	0.02	-0.75	0.23	0.51	0.35	-0.38	0.65	-0.69
2019	0.03	-0.76	0.20	0.48	0.37	-0.38	0.66	-0.68
2020	0.00	-0.77	0.36	0.36	0.33	-0.30	0.66	-0.86
2021			0.11	0.49			0.28	-0.74

Source: author´s development

According to Table 2.2, before 2008, China's Tourism Competitiveness (TC) was positive with a small value of around 0.11, indicating a slight competitive advantage. However, since 2009, China's TC Index has turned negative, and its absolute value has been increasing. This is consistent with the continuous decline in China's international market share, suggesting that China's tourism industry's competitiveness is declining. From 2005, where it had a small competitive disadvantage of 0.15, it has decreased to a significant disadvantage of -0.77 in 2020. There is comparison with that of 2021 due to missing import data. In contrast, Japan's TC Index was negative before 2014, but it has been on the rise since 2015. It increased from a small competitive disadvantage of -0.01 in 2014 to a competitive advantage of 0.33 in 2020, indicating that Japan's international tourism competitiveness is continuously improving. As a leading country in tourism

development, the United States has always maintained a positive and stable TC Index of around 0.30, indicating a strong competitive advantage. This is because the United States has an absolute advantage on IMS Index, suggesting that the US tourism industry relies to some extent on imports. After removing factors such as market size and price levels, Spain and Thailand have become two of the most internationally competitive countries in tourism services trade. Spain's TC has been consistently positive with an average of around 0.55, but it shows a downward trend overall (from 0.55 in 2005 to 0.36 in 2020). Thailand's TC has an average of around 0.55, with an overall upward trend (from 0.43 in 2005 to 0.66 in 2020, but it declined to 0.28 in 2021 due to the impact of the COVID-19). In 2013, Thailand even reached a high of 0.71. Both Spain and Thailand's TC Index averages are greater than 0.5, indicating that they have a significant competitive advantage. Germany's TC Index has consistently been negative, with an average of -0.38, showing an overall upward trend (from -0.44 in 2005 to -0.28 in 2020), but it still has a small competitive disadvantage. Ukraine, similar to China, had a positive TC Index of around 0.15 before 2010, indicating a small competitive advantage. However, since 2011, Ukraine's TC Index has turned negative, and its absolute value has been increasing, consistent with the continuous decline in Ukraine's international market share, suggesting that Ukraine's tourism industry's competitiveness is declining. From 2005, where it had a small competitive disadvantage of 0.05, it has decreased to a significant disadvantage of -0.74 in 2021.

Revealed Comparative Advantage (RCA) is a theory proposed by American economist Balassa. It refers to the ratio of a country's export value of a certain product to its total export value, compared to the ratio of global export value of that product to the total global export value. This theory avoids various assumptions and eliminates the impact of fluctuations in a country's and the world's total export volumes, providing a good reflection of a country's relative advantage in a certain industry compared to the world average level. RCA is one of the most reliable indicators for measuring whether a product has international competitiveness.

$$\mathrm{RCA} = (X_{ij}/X_{it})/(X_{wj}/X_{wt})$$ Formula 2-3

Among them, X_{ij} indicates the export value of product *j* in country *i*, X_{it} indicates the export value of service trade in country *i*, and X_{wj} represents the global export value of product *j*, X_{wt} indicates the value of global services trade exports. The evaluation criteria for the RCA index are shown in Table 2.3.

Table 2.3 - RCA index Criteria

Indicator size	Strong or weak competitiveness
RCA >2.5	Extremely strong
1.25<RCA =<2.5	Strong
0.8=<RCA=<1.25	Medium
RCA <0.8	Weak

Data source: https://data.drcnet.com.cn/

Looking at Table 2.4, a comparison between China and Japan reveals opposite trends in their RCA. China's RCA index reached 1.44 in 2005, indicating strong competitiveness, but has since exhibited a fluctuating downward trend, reaching its lowest point of 0.52 in 2019, suggesting weak competitiveness. In contrast, Japan's RCA index was only 0.47 in 2005, indicating weak competitiveness, but has since shown a fluctuating upward trend, reaching 0.95 in 2019, indicating moderate competitiveness. Due to the impact of the COVID-19, both countries experienced a decline in their RCA in 2020 and 2021. When comparing China to Germany, a country with similar competitiveness, Germany's RCA index is consistently lower than China's and has remained stable, with a mean value of around 0.61, indicating weak competitiveness. However, for the first time in 2020 and 2021, Germany's RCA index surpassed China's. This demonstrates that China's tourism industry is weak and declining, and its development is not optimistic. Looking at three countries with strong competitiveness - Thailand, Spain, and the United States - Spain and the United States' RCA are stable, with Spain consistently maintaining a strong advantage with an index of around 2.10 and the United States with a moderate competitiveness with an index of around 0.91.

Table 2.4 - Revealed Comparative Advantage (RCA)

Year	China	American	Spain	Japan	Germany	Thailand	Ukraine
2005	1.41	0.97	2.12	0.47	0.69	1.82	1.17
2006	1.42	0.93	2.10	0.31	0.71	2.14	1.16
2007	1.12	0.91	2.14	0.32	0.69	2.26	1.26
2008	1.04	0.93	2.14	0.32	0.69	2.29	1.28
2009	1.12	0.89	2.12	0.35	0.63	2.16	1.00
2010	1.05	0.94	2.10	0.41	0.64	2.39	0.87
2011	0.99	0.93	2.08	0.32	0.65	2.69	0.85
2012	1.01	0.95	2.07	0.44	0.63	2.70	0.92
2013	1.01	0.98	2.12	0.46	0.62	2.78	0.93
2014	0.83	1.01	2.16	0.49	0.61	2.79	0.46
2015	0.85	1.05	2.12	0.65	0.55	2.93	0.36
2016	0.87	1.03	2.09	0.73	0.53	2.87	0.36
2017	0.70	0.99	2.16	0.77	0.52	3.05	0.37
2018	0.61	1.00	2.21	0.93	0.52	3.06	0.39
2019	0.52	0.96	2.15	0.95	0.51	3.12	0.40
2020	0.57	0.95	1.90	0.62	0.67	4.17	0.21
2021	0.29	0.89	2.84	0.28	0.58	1.94	0.51

Source: author´ s development

Thailand's RCA is particularly strong, with an index of 1.79 in 2005 rose to 4.07 in 2020, indicating an extremely strong comparative advantage. Ukraine's RCA index was 1.17 in 2005, indicating some competitiveness, but has since exhibited a fluctuating downward trend, reaching 0.04 in 2019, indicating increasingly weak competitiveness. Overall, according to the RCA index, there is still a considerable gap between China and tourism industry powers.

The Vollrath’s Revealed Comparative Advantage (VRCA) is a revision of the RCA index proposed by economist Vollrath. This index takes into account the impact of imports and exports on the comparative advantage of an industry, as well as the dynamic relationship between world trade. It is objective and addresses the limitations of the RCA index. The formula is shown in 2-4.

$$\text{VRCA} = \text{RCA} - \frac{M_{ij}/M_{it}}{M_{wj}/M_{wt}}$$ Formula 2-4

Where M_{ij} is the import of product *j* from country *i*, M_{it} is the import of service trade from country *i*, M_{wj} is the import of product *j*, and M_{wt} is the import of service. A VRCA index equal to zero indicates self-balance, meaning that the country does not have either a competitive advantage or disadvantage. A VRCA index greater than zero indicates that the country *i* has a competitive advantage in the product or service, while a VRCA index less than zero indicates a competitive disadvantage in the product *j* or service.

Table 2.5 - Versus Revealed Comparative Advantage (VRCA)

Year	China	American	Spain	Japan	Germany	Thailand	Ukraine
2005	0.39	-0.05	1.12	-0.60	-0.71	1.26	-0.39
2006	0.42	-0.07	1.08	-0.48	-0.66	1.56	-0.19
2007	0.15	-0.06	1.05	-0.39	-0.67	1.69	-0.09
2008	0.04	-0.02	1.02	-0.37	-0.71	1.81	0.16
2009	-0.06	-0.05	1.04	-0.35	-0.76	1.61	-0.28
2010	-0.18	0.03	0.98	-0.33	-0.64	1.80	-0.45
2011	-0.30	0.04	0.98	-0.36	-0.63	2.15	-0.68
2012	-0.55	0.07	0.99	-0.21	-0.60	2.11	-0.65
2013	-0.64	0.11	0.96	-0.09	-0.56	2.20	-0.64
2014	-1.30	0.18	1.06	0.08	-0.53	2.15	-1.29
2015	-1.49	0.18	0.98	0.28	-0.49	2.19	-1.62
2016	-1.45	0.14	0.94	0.33	-0.48	2.03	-1.82
2017	-1.51	0.08	0.91	0.39	-0.52	2.13	-1.94
2018	-1.56	0.05	0.89	0.52	-0.54	2.16	-1.95
2019	-1.59	0.00	0.80	0.51	-0.55	2.21	-1.99
2020	-2.32	0.31	0.72	0.38	-0.44	3.66	-3.63

Source: author´s development

According to Table 2.5, Spain and Thailand have significantly higher VRCA index than other countries, consistently above zero and their mean values reaching 1.068 and 2.18 respectively, indicating strong relative competitive advantage. This

is consistent with the TC and RCA index, which also reflect their strong competitive advantage. The VRCA index for the United States was negative before 2009, indicating a competitive disadvantage, but it has been fluctuating and rising since then, reaching a high of 0.31 in 2020, indicating a competitive advantage. Compared to the IMS index for the United States, the advantage shown by the VRCA index is not significant, indicating that although the United States has a large tourism services trade volume, its advantage in tourism services trade is not as great as that of Thailand and Spain. Germany's VRCA index has changed relatively little and has remained below zero, indicating a competitive disadvantage.

As shown in Figure 2.13 , Thailand, China, and Ukraine have completely opposite trends in VRCA index. The VRCA index of China has changed from positive to negative, decreasing year by year from 0.39 in 2005 to -2.32 in 2020, indicating a shift from competitive advantage to competitive disadvantage. Except for a VRCA index of 0.16 in 2008, Ukraine has had negative VRCA index in all other years, and the absolute value of the VRCA index has been increasing year by year, showing a decreasing trend from -0.39 in 2005 to -3.36 in 2020, indicating an increasing competitive disadvantage. On the other hand, Thailand's VRCA index has changed from negative to positive, increasing from 1.26 in 2005 to 3.66 in 2020. From the VRCA graph, it can be seen that Japan took almost 10 years to shift from a disadvantage to an advantage in tourism service trade, while Thailand's competitive advantage has become increasingly evident, which is something China can learn from. In terms of numerical values, China's VRCA index reached -2.32 in 2020, and the gap between China and other developed countries in the tourism industry competitiveness is becoming wider.

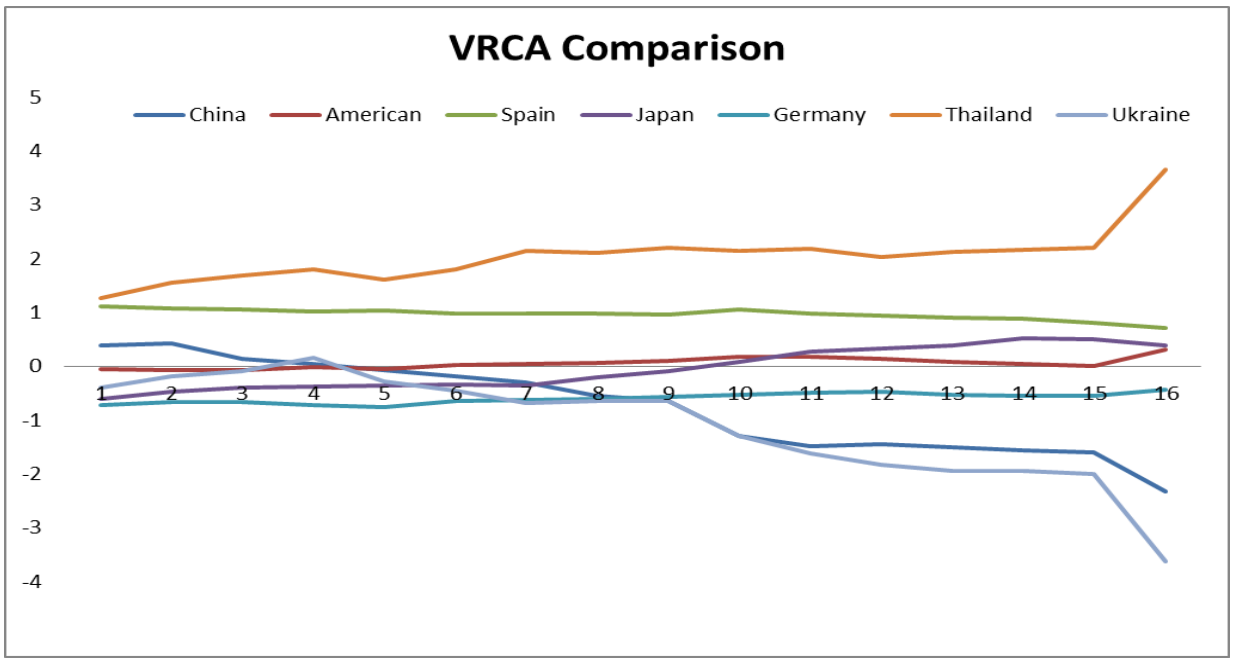

Figure - 2.13 VRCA Trend

Source: author´ s development

This study first used IMS index, TC index, RCA index, and VRCA index to measure the international competitiveness of China's tourism industry from 2005 to 2020. Each of these four indicators has its own emphasis, although they are not perfect and each indicator still has certain limitations, they have strong reference value for measuring the size of a country's tourism competitiveness. By comparing the mean values of IMS index, TC index, RCA index, and VRCA index from 2015 to 2020, China's tourism competitiveness can be seen in Figure 2.14 to Figure 2.17.

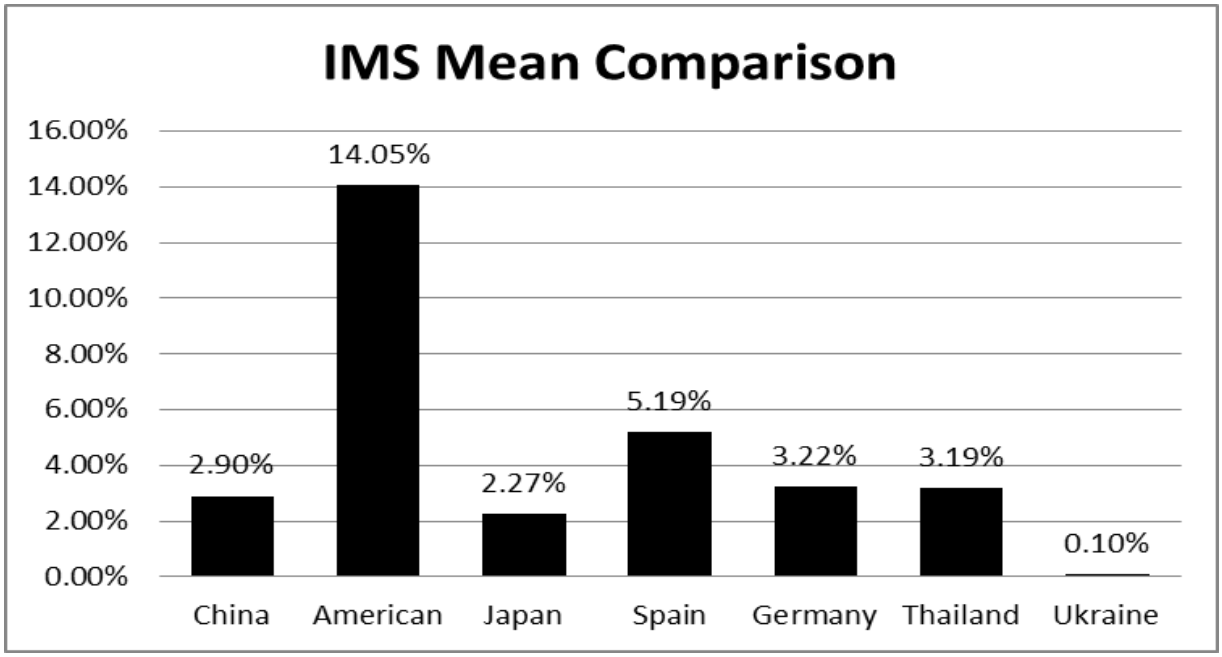

Figure 2.14 - Comparison of competitiveness means

Source: author´ s development

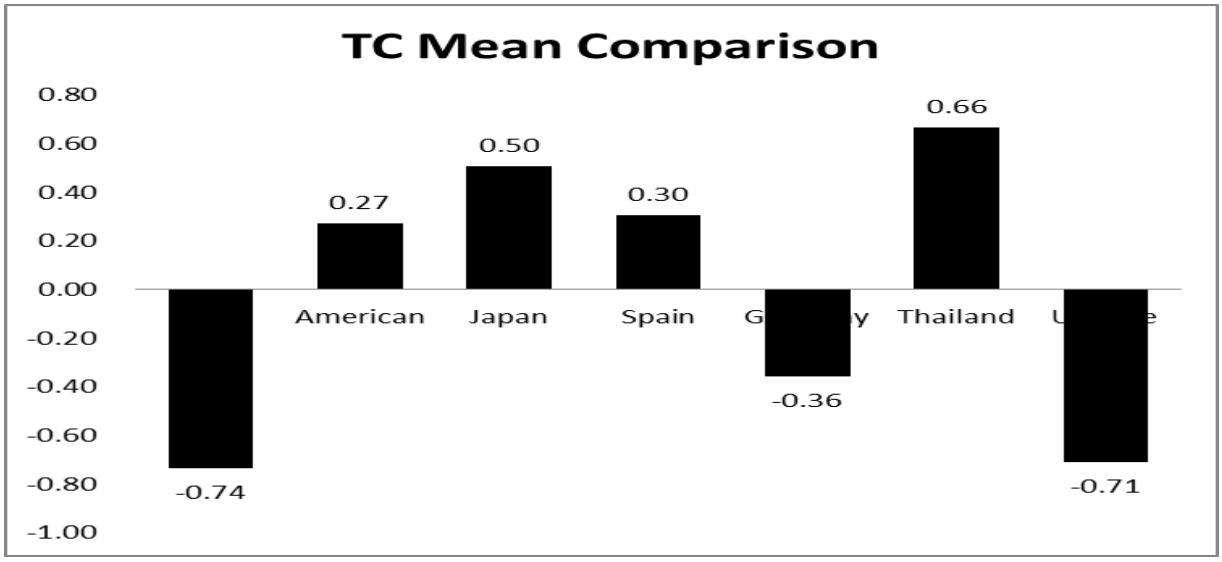

Figure 2.15 - Comparison of competitiveness means

Source: author´ s development

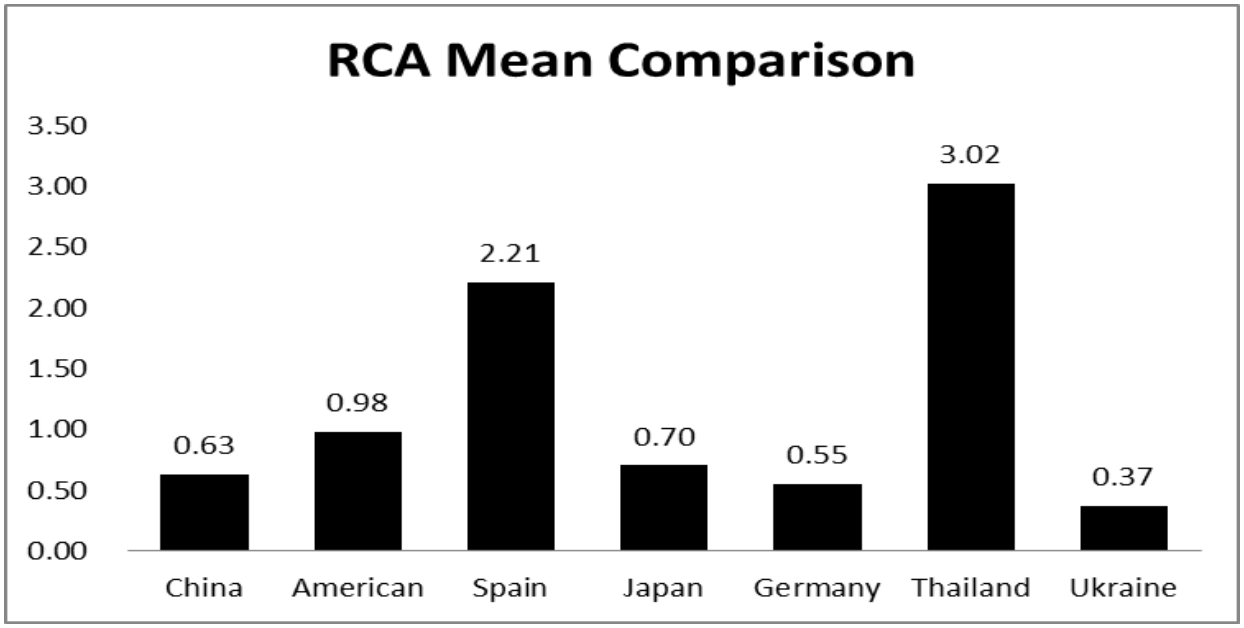

Figure 2.16 - Comparison of competitiveness means

Source: author´ s development

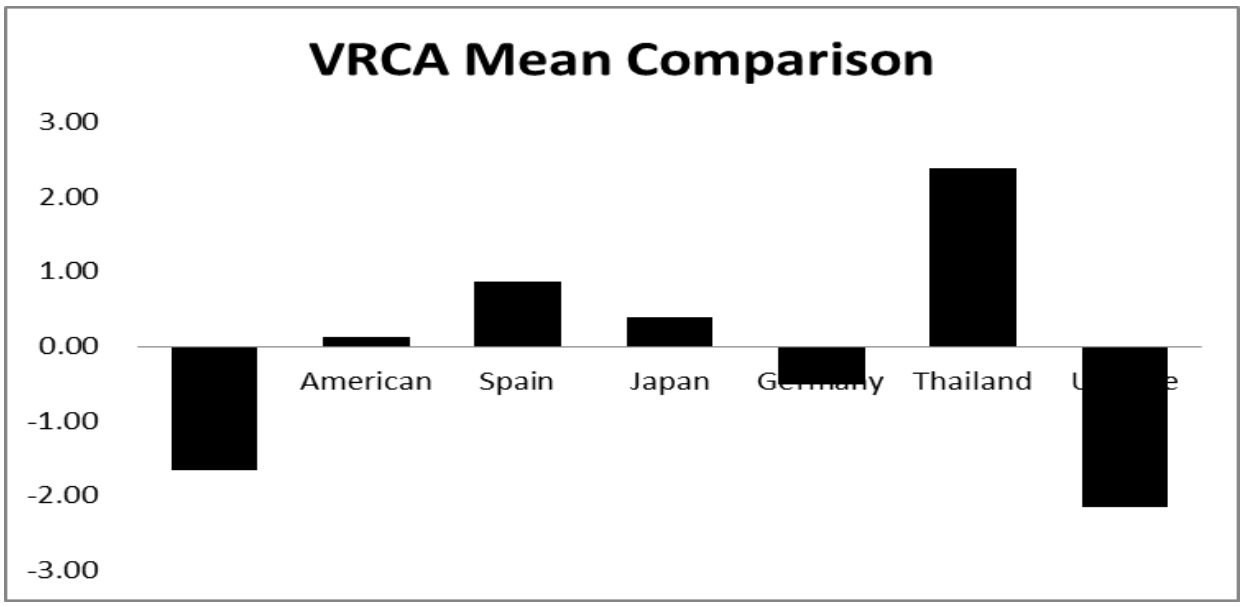

Figure 2.17 - Comparison of competitiveness means

Source: author´ s development

By comparing, China's international market share (IMS) in the tourism industry is lower than that of the United States by a significant 11.15 percentage points, although it still has certain advantages compared to other countries, especially Ukraine where it is higher by 2.8 percentage points. From the perspective of service trade competitiveness (TC), both China, Germany and Ukraine have negative values, indicating that they do not have a competitive advantage. In terms of revealed comparative advantage (RCA), China's competitiveness is relatively weak, and from the perspective of the Vollrath's Revealed Comparative Advantage(VRCA), its competitive advantage is negative. Apart from having certain advantages in IMS and RCA indices that China is at a competitive disadvantage, in the other two indices it does not have international competitiveness. While China is a tourism power, as seen from its high IMS value, it is at a competitive disadvantage when considering the TC and VRCA indexes, which reveals serious imbalances in inbound and outbound tourism. Based on the RCA index, it can be seen that China's inbound tourism has encountered obstacles in recent years. Despite continuous expansion, China's international competitiveness in the tourism industry has gradually declined from a country with a small comparative advantage to one with a comparative disadvantage. In conclusion, China has rich tourism resources, but it is not a tourism superpower

and still has a considerable distance to go to catch up with others.

As China's tourism industry has developed, the country has implemented a series of inbound and outbound policies in 2014. Therefore, the average values of IMS, TC, RCA, and VRCA indexes from 2016 to 2020 were used to comprehensively evaluate the size of China's international competitiveness in the tourism industry, as shown in Table 2.6.

Table 2.6 - Competitiveness Indicators of China

	IMS	TC	RCA	VRCA
Size of indicators	2.952%	-0.746	0.65	-1.688
International competitiveness	Weak competitive advantage	Competitive disadvantage	Weak competitive disadvantage	Competitive disadvantage

Data source ： https://data.drcnet.com.cn/

The Chinese tourism industry has a certain advantage in the IMS index, but it is comparatively weak in the other three indexes, indicating a lower international competitiveness. This is consistent with the 2019 ranking by the World Economic Forum (WEF).

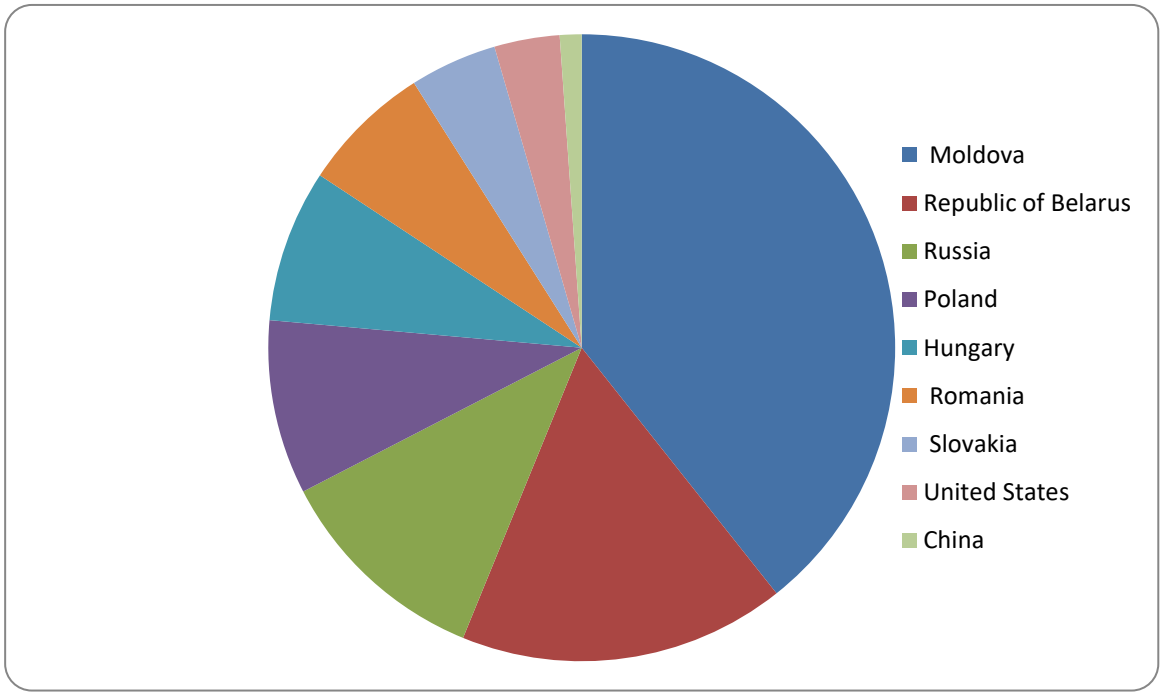

Figure 2.18 - Distribution of inbound tourism in Ukraine

The development of tourism in Ukraine is conducive to the increase of local

employment opportunities. For every 1,000 tourists, there are 1,000 jobs guaranteed (200 in tourism enterprises and 800 in related industries), while the cost of establishing a job in tourism enterprises is about 20 times lower than that in the industrial range. Tourism is a major source of foreign exchange earnings because it exports services to foreigners.[2]

Table 2.7 – Top10 Number of tourists to Ukraine in 2019

The serial number	country	The number of people
1	Egypt	902600
2	Turkey	515582
3	Turkmenistan	297744
4	India	284956
5	China	243729
6	USA	230462
7	Lebanon	229484
8	United arab emirates	115887
9	Belarus	66400
10	Germany	41576

The Figure 2.18 and Table 2.7 show the large number of foreign tourists in Ukraine in recent years, which shows that the tourist attractions in Ukraine are still very attractive. In 2016, the simplified visa process for Chinese tourists was started at the airports of "borispol" (Kiev) and “Odessa” in Ukraine, and the visa processing time was equal to 15 to 20 minutes. As a result, the flow of tourism from China has soared. At a press conference marking the 25th anniversary of China's diplomatic relations with Ukraine, Chinese ambassador John Dewey said the number of Chinese citizens visiting Ukraine from China in 2016 was 20,600, the highest number in the past 10 years. However, it must be admitted that most of the Chinese visitors to Ukraine are businessmen, while the number of tourists is only 536. If Ukraine underestimate China's huge market and Ukraine will lose hundreds of billions of dollars in profits. According to the world travel and tourism council, Chinese people increased their spending in foreign countries by more than 10 percent after 2004, and by 25 percent in 2019 to $2920 billion. According to this, the flow of outbound tourism in China is expected to exceed 200 million people by 2021, and the relevant investment will reach 3 trillion yuan (over 3.4 billion us dollars). The simplification

of the visa system has boosted tourist flows from China. Historically, the largest number of foreigners entering Ukraine has been from border countries, whose share has gradually declined from 85.5 percent to 80.7 percent since 2016.

Data released by the China tourism academy shows that it has become easier for Chinese tourists to travel to Europe as a number of new routes to Europe have been opened across China. In the first half of 2019, 3 million Chinese tourists visited Europe. Central and eastern Europe and the silk road countries are getting a lot of attention. Key silk road hubs such as Georgia, Armenia and Azerbaijan and Ukraine are also becoming popular destinations for Chinese tourists, according to booking data from brilliance CITS.

Under the background of international cooperation under the " The Belt And Road Initiative ", the development of tourism in Ukraine has better promoted the rapid economic growth. To analyze the source of economic growth, we must know the main driving force of economic growth. Neoclassical economic theory argues that economic growth depends on three factors: labor, capital, and technological progress. Because of the limitation of labor, the marginal return of capital is in a decreasing state, which means that the economy is stable, and the stable economic state depends on the exogenous technology. This paper mainly studies the relationship between Ukraine tourism and economic growth. The main model of economic growth is Cobb-Douglas production function.

$$Y=AL\alpha K\beta \qquad \text{Formula 2-5}$$

Where Y is total output and K is capital stock (representing the fixed asset investment stock in the economy), L refers to human capital (representing labor input), A as other influencing factors (e.g. technological innovation, industrial restructuring, etc.), $A > 0$, α indicates the share of labor contribution in total production ($0 < a < 1$), β indicates the share of capital contribution in total production ($0 < \beta < 1$), $\alpha + \beta = 1$. Now we add tourism to the production function, and we get the following econometric models:

$$Y=AT\gamma L\alpha K\beta \qquad \text{Formula 2-6}$$

T is the tourism income variable and γ contributes to the share of the total

assets. Considering the economic significance of the data, the linear model is obtained by taking the logarithm on both sides of the equation at the same time.

$$InY= InA+InTϒ+InLα+InKβ \quad \text{Formula 2-7}$$

γ, α and β respectively represent the contribution rate of each factor to the total assets and bring in the related variables further. We get the final measurement model as follows:

$$InY=β0+β1InT+β2InL+β3InK+μ \quad \text{Formula 2-8}$$

InA=β0, Y residents' annual total income, β0-β3 as regression coefficient, μ as residual term

Therefore, this formula can be used to calculate the relationship between Ukraine tourism and economic growth.

From the Statistical Yearbook of the Ukraine Government and a statistical report on tourism operators in 2019, we can get the following data:

Table 2.8 – Initial data for empirical research

Year	GDP (Unit:10million$)	TI(Tourism Income) (Unit: million $)	L(Labor input) (Unit: million $)	K(capital input) (Unit: 10million $)
2013	1833.10	5931	9158.3	37147.5
2014	1335.03	2264	8926.1	49114.7
2015	910.31	1662	8603.7	27290.5
2016	933.56	1723	10450.7	14098.9
2017	1121.90	2019	12354.8	27621.1
2018	1308.32	2269	11633.2	34321.4
2019	1540.43	3477	12833.8	43720.3

Based on the data collected above, we can see that the explanatory variables are different from the statistical units of the explained variables, so we use the Stata 15 to take the natural logarithm of each variable, and the results are as follows:

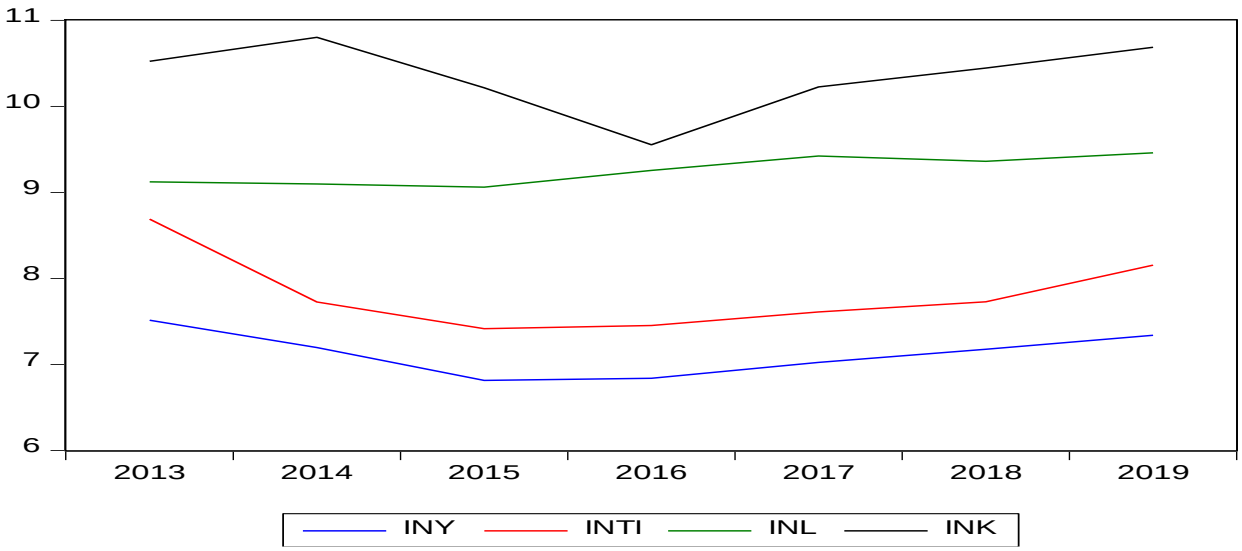

Figure 2.19 - Graphic Trend Analysis

According to the data of 2013-2019, we use the software Eviews to fit and analyze the explanatory variables and the explained variables. Further, we can see that each variable is on the rising trend, and the development of tourism and economic growth tends to be consistent.

Dependent Variable: INY
Method: Least Squares
Date: 06/19/20 Time: 05:02
Sample: 2013 2019
Included observations: 7

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.149106	1.700340	-0.087692	0.9356
INTI	0.433225	0.070769	6.121662	0.0088
INL	0.193030	0.166175	1.161609	0.3294
INK	0.203092	0.077472	2.621501	0.0789

R-squared	0.966017	Mean dependent var	7.128908
Adjusted R-squared	0.932034	S.D. dependent var	0.256277
S.E. of regression	0.066812	Akaike info criterion	-2.278295
Sum squared resid	0.013392	Schwarz criterion	-2.309204
Log likelihood	11.97403	Hannan-Quinn criter.	-2.660319
F-statistic	28.42629	Durbin-Watson stat	3.328770
Prob(F-statistic)	0.010526		

From the above regression results, we conclude that:

$$InY=-0.149106+0.433225InT+0.193030InL+0.203092InK+\mu$$

（-0.087692）（6.121662）（1.161609）（2.621501）

From the above formula, we can see that when the tourism income increases by 1 unit, the national economic growth is 0.433225, which means that there is a close relationship between the growth of tourism and economic growth.

Heteroskedasticity Test: White

F-statistic	1.638594	Prob. F(3,3)	0.3474
Obs*R-squared	4.347072	Prob. Chi-Square(3)	0.2263
Scaled explained SS	0.296603	Prob. Chi-Square(3)	0.9607

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/19/20 Time: 05:49
Sample: 2013 2019
Included observations: 7

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.024986	0.019804	1.261665	0.2962
INTI^2	-0.000188	0.000101	-1.860221	0.1598
INL^2	-0.000248	0.000208	-1.191958	0.3190
INK^2	9.08E-05	8.76E-05	1.036154	0.3763

R-squared	0.621010	Mean dependent var	0.001913
Adjusted R-squared	0.242021	S.D. dependent var	0.001781
S.E. of regression	0.001551	Akaike info criterion	-9.804693
Sum squared resid	7.21E-06	Schwarz criterion	-9.835601
Log likelihood	38.31643	Hannan-Quinn criter.	-10.18672
F-statistic	1.638594	Durbin-Watson stat	2.501851
Prob(F-statistic)	0.347443		

White's test results showed that the P-value of 0.2263 significantly rejected the original hypothesis, so the regression effect of the model was better.

R-squared ＝ 0.966017 S.E. of regression ＝ 0.066812 F-statistic ＝ 28.42629

T-test: look at T1 = 6.121662, T2 =1.161609, T3 = 2.621501,

The threshold value of t-bilateral test with freedom of7-4 =3,at the level of 5% significance.

Then we know that the coefficient t-test of some explanatory variables is significant and passes the T-test. Therefore, we can conclude that the development of tourism industry can better promote economic growth and increase farmers' income. We forecast tourism development and economic growth (Figure 2.20).

Through the forecast of tourism development and economic growth data for 2013-2019, we can see that the economy is in a growing trend since 2015, from which we conclude that development of tourism can promote the sustainable

development of the economy. Therefore, under the Belt and Road strategy, the development of tourism in Ukraine can better achieve economic growth.

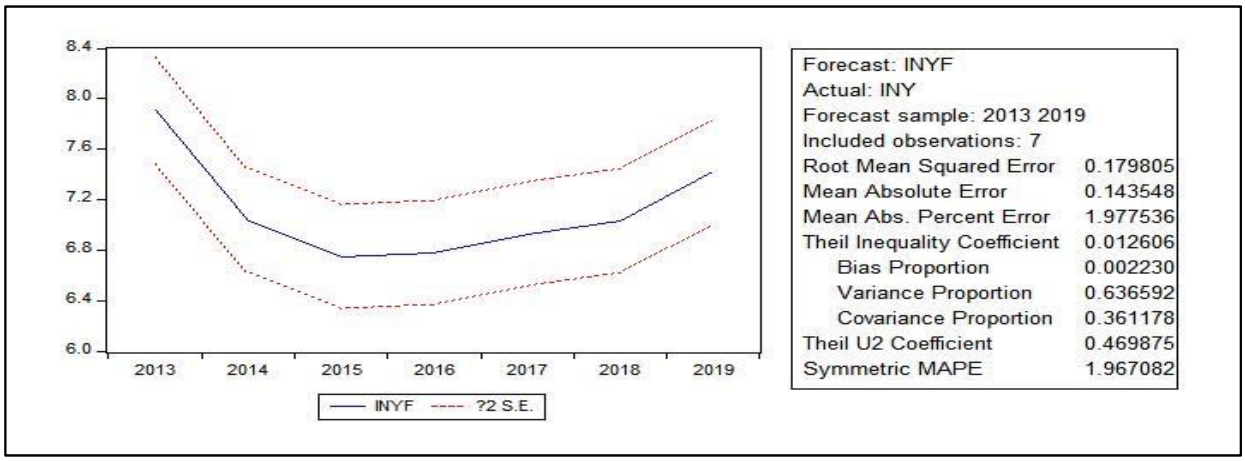

Figure 2.20 - The forecast of tourism development and economic growth in Ukraine

Opportunities for international cooperation in tourism: " The Belt and Road Initiative " provides an opportunity for the international route of Ukraine tourism. Through international tourism cooperation, it let Ukraine's tourism industry, tourism culture to the world, and let Ukraine's tourism brand to the world, let Ukraine's tourism brand to the world. International cooperation has put Ukraine's tourism industry on the world stage and contributed to Ukraine's position in the world tourism industry. It is a good way to learn from the international advanced ideas. In the tourism international cooperation environment under the " The Belt And Road Initiative " strategy, Ukraine's international tourism is going global, which also provides a good opportunity for domestic tourism enterprises to learn from the advanced experience of other countries. Let cooperation become a good way for tourism enterprises to develop and improve. The participation of Ukraine's tourism industry in international tourism cooperation is bound to become an important link in the outward expansion and dissemination of Ukrainian culture, so that people around the world can feel the essence of Ukrainian culture and understand the world's outstanding culture.

2.3 Analysis of factors influencing the competitiveness of China’s tourism industry

This chapter will analyze the factors influencing the international competitiveness of China's tourism industry, with the aim of identifying the factors that have a significant impact on China's tourism industry[140-145].

(1) Qualitative Analysis of Factors Affecting China's International Competitiveness in Tourism

There are several models used to evaluate a country's tourism competitiveness, including the World Economic Forum (WEF) evaluation system, the diamond theory evaluation system, and the International Institute for Management Development (IMD) system as shown in Figure 2.21.

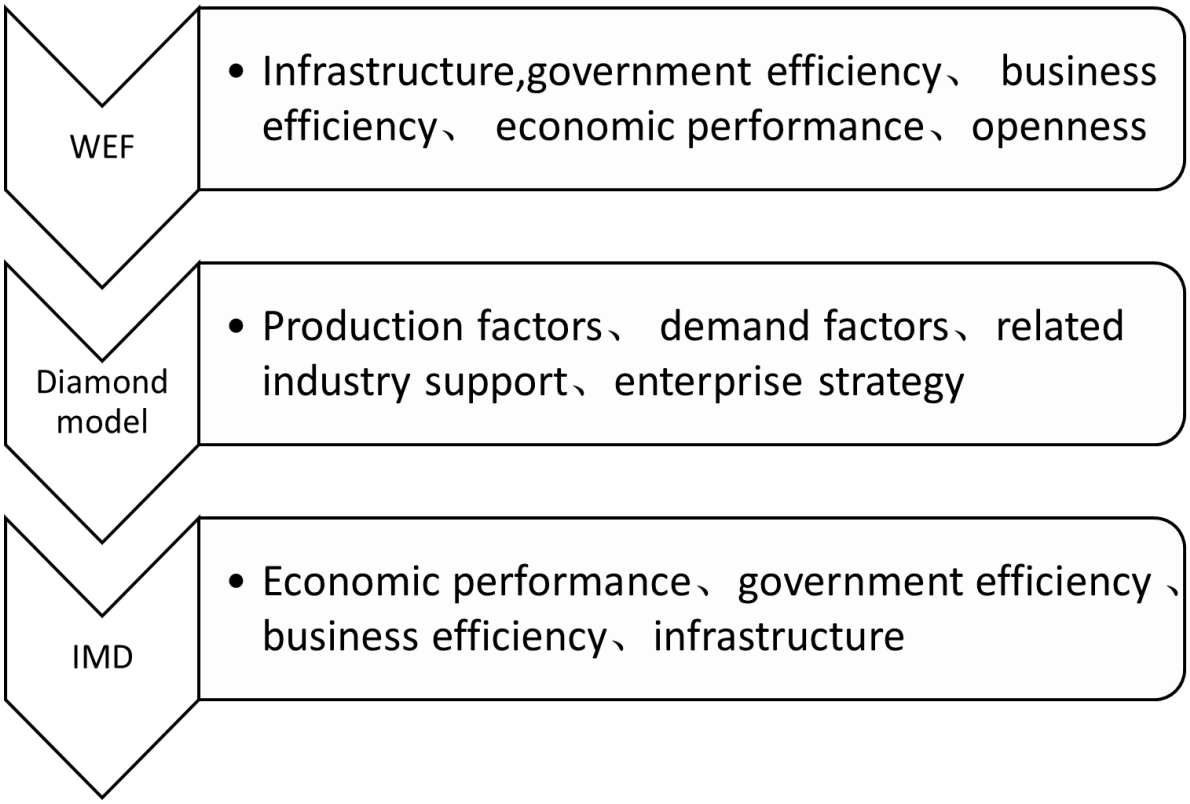

Figure 2.21 - Comparison of model systems

Source: author´ s development

Each model has different factors, and this study selected Michael Porter's theory of national competitive advantage, also known as the famous "diamond model," and used María del P. Pablo-Romero's views for analysis[61, 146, 147]. In

studying international economic competition, Porter discovered that the strength of a country's international competitiveness is mainly influenced by four key factors: factor conditions (basic, advanced, and specialized factors of production), demand conditions, related supporting industries, and firm strategy, structure, and rivalry. These four factors interact with each other and work together to determine a country's competitiveness (see Figure 2.21).

Production factors

Production factors can be classified into basic factors and advanced factors. In terms of basic factors, this study will select the number of world-class scenic spots to analyze their impact on the competitiveness of China's tourism service trade. Basic factors include natural resources, climate, and geographical location. China has a vast territory with a land area of 9.6 million square kilometers and rich natural resources, including lakes (West Lake in Hangzhou, Qinghai Lake, Xuanwu Lake in Nanjing), mountains (Yanshan, Huangshan, Taishan), forests (Xishuangbanna, Zhangjiajie, Sichuan Wolong), landscapes (Three Gorges, Guilin Lijiang River), coastal scenic areas (Xiamen, Hainan’s Ultima Thule). China is one of the four ancient civilizations and has 55 world heritage sites, ranking first in the world. China undoubtedly has a significant competitive advantage in terms of basic resources. With such rich natural resources, China has launched many high-quality tourist routes, such as the "Silk Road", which takes the Silk Road culture as its core and spans six provinces. It is a typical international tourism route and has received great fame at home and abroad. The "Coastal Vacation" tourism route connects coastal tourist destinations in eastern China by sea and air routes, guiding residents to leisure vacations. The "Beijing-Xi'an-Shanghai-Guilin-Guangzhou" route connects famous tourist cities is known as the "Classic China" tourism route. Although China's primary resources are abundant, due to the excessive emphasis on short-term benefits in the development of resource elements, the sustainable development of the tourism industry has not received enough attention, and environmental pollution is frequent. For example, the "Mirror of the Sky" in the Chaka Salt Lake has become a garbage dump, which not only causes ecological damage but also greatly worsens

tourists' travel experiences[148]. In the "Travel and Tourism Competitiveness Report" launched by the World Economic Forum in 2019, China ranked first in the world in terms of culture and tourism resources, but ranked 120th out of 140 countries in terms of sustainable tourism development, which is at the bottom of the world[149-151].

Advanced factors, in the context of tourism, refer to human capital, i.e., professionally trained tourism practitioners[152]. The tourism industry is one of the most labor-intensive industries, and the outbreak of COVID-19 has posed a risk of unemployment for millions of tourism practitioners worldwide. During the COVID-19 pandemic, the number of travel agency employees in China decreased by 137,190, a decrease of 31.78% compared to before the outbreak. Currently, China's tourism talent employment faces serious problems. In terms of quantity, the number of tourism majors in China has decreased from 576,200 in 2012 to 400,000 in 2017, a decrease of 30.57%, while the number of domestic and international tourist trips has increased by 69.12% and 5.35%, respectively. In terms of quality, according to the 2020 National Travel Agency Statistics and Survey Report, there were 331,500 travel agency employees in China, with 102,200 of them having a degree below the college degree, accounting for 30.65%. The overall quality of talent is low and the talent structure is unbalanced. In the new economic growth theory, human capital is considered an independent variable and is included in endogenous growth models to explain the reasons for economic growth[153]. This dissertation will analyze the impact of high-quality talents in the tourism industry, specifically the number of students studying tourism in universities, on China's international competitiveness in tourism.

The increase in the number of domestic tourists in China will gradually lead to more demanding customers. According to Porter's theory, knowledgeable and demanding customers can stimulate domestic enterprises' competitive advantage, which in turn will encourage companies to provide higher quality services, generate a more competitive tourism industry, and offer more diversified services, such as the popular "red tourism," sports tourism, ecotourism, cultural tourism, and rural

tourism in recent years. This effectively promotes the development of China's domestic tourism industry and enhances China's tourism competitiveness[154-156]. This study will select domestic tourism consumption in China as a demand factor to analyze its impact on China's tourism competitiveness. Domestic tourism consumption in China can reflect domestic tourism demand and also to some extent reflect the quality of domestic tourism products, which is representative. The growth of domestic tourists in China is basically consistent with the growth of per capita GDP, as shown in Figure 2.22.

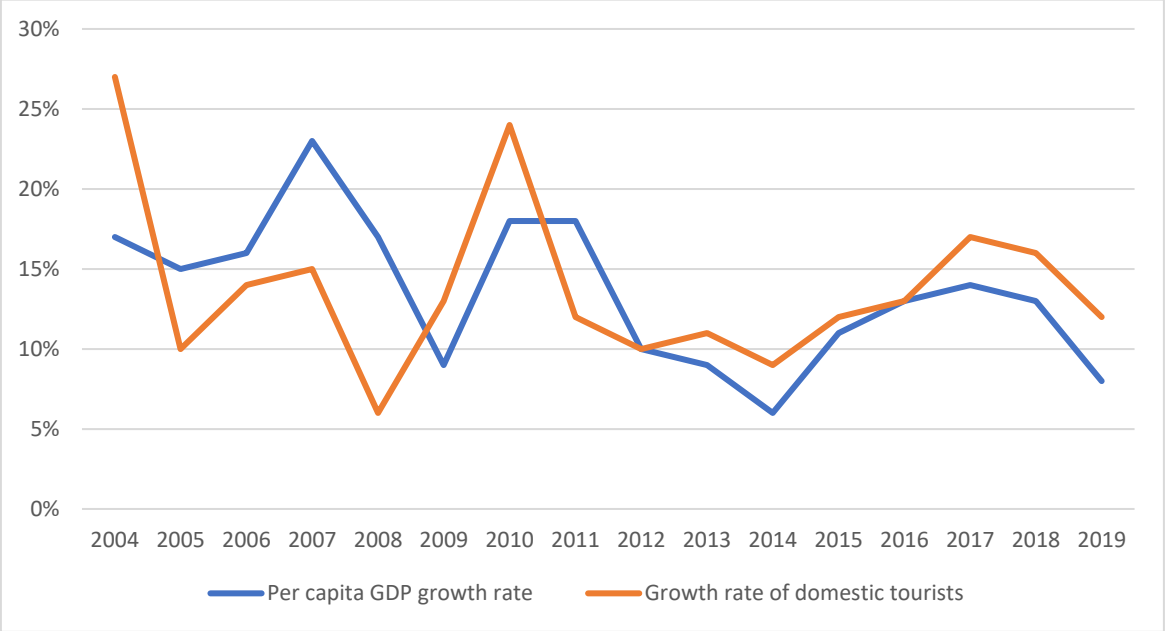

Figure 2.22 - Per capita GDP growth versus domestic passenger growth

Data source: China Statistical Yearbook 2020

Since the beginning of the 21st century, the income of Chinese residents has steadily increased, and per capita GDP has grown from 12,500 yuan in 2004 to 70,300 yuan in 2019, an increase of four times. The Chinese people have basically achieved a moderately prosperous life from the previous struggle for subsistence. The number of domestic tourists in China has also increased from 1.102 billion in 2004 to 6.006 billion in 2019, also increasing fourfold. With the rapid growth of domestic tourists in China, tourism consumption has also increased significantly, from 352.24 billion yuan in 2004 to 5.73 trillion yuan in 2019, an increase of 15 times. In 2020, due to the outbreak of the COVID-19, the number of domestic tourists in China sharply decreased by 52.6% compared to the previous year, to only

2.879 billion. However, due to the effective prevention and control of the epidemic, domestic tourism quickly recovered, and in the first half of 2021, the number of domestic tourists reached 1.871 billion, an increase of 100.58% compared to the previous year. According to data from Ctrip, during the 2021 May Day holiday, the search volume for domestic flights exceeded 5 times that of the previous year. Currently, the development of domestic tourism in China is focused on the domestic circulation. Although the domestic tourism market in China has achieved good results in recent years, the current tourism products are still relatively single, with most tourist attractions still focusing on sightseeing, and not conducting deep development of tourism products, resulting in limited income sources. According to the 2019 Tourism Development Report, the proportion of ticket income for tourist attractions is still as high as 24%, and tickets are expensive. According to a report released by the Chinese Academy of Social Sciences, half of the tickets for 5A tourist attractions exceed 100 yuan, which is equivalent to 3.9 times the per capita disposable monthly income in 2019. In comparison, ticket prices for well-known tourist attractions in the United States, France, and other countries are less than 1% of the local residents' disposable income. In terms of tourism souvenirs, Chinese tourism souvenirs lack cultural connotations, are highly homogenized, of poor quality, and expensive. For example, a silk scarf called "Hang Embroidery" in Hangzhou, becomes "Suzhou Embroidery" in Suzhou, and "Bian Embroidery" in Henan. Many souvenirs only have local scenic spots printed on silk scarfs, fans, or phone cases, lacking attractiveness. These factors greatly inhibit the enthusiasm for shopping, with tourism shopping only accounting for 23.08%, while in developed countries this proportion is as high as 60%-70%[157].

Related and supportive industries for tourism mainly include transportation, accommodation, and finance. In China, transportation is mainly composed of railways and aviation. As of 2020, the operating mileage of China's railways has reached 146,300 kilometers, and the passenger volume per kilometer reached 1.49 trillion, ranking first in the world far ahead of India in second place. The operating mileage of China's high-speed railways reached 37,900 kilometers, nearly doubled

from 19,800 kilometers during the "13th Five-Year Plan" period, and remains the world's first place. In recent years, with the opening of Chengdu-Guiyang, Baoji-Lanzhou, and Quzhou-ningxia railways, the northwest region has been connected to the national high-speed railway network, making people of cities and counties ushered in the "high-speed railway era", bringing new development opportunities to the local tourism industry. China's aviation industry also has great competitiveness. According to the 2020 World Air Transport Report, China has become the world's largest domestic aviation market for the first time, accounting for nearly 20% of the global total passenger volume. The improvement of transportation greatly enhances the support for tourism. With the increase in the number of tourists, higher requirements are placed on the accommodation, and high-quality resort hotels have become the main choice for many middle and high-income people[158]. In terms of the number of star-rated hotels in China, there has been a downward trend in recent years. As shown in Figure 2.23, it has decreased from 14,513 in 2011 to 11,912 in 2020. However, from a structural point of view, the proportion of three-star and above hotels has increased, and the decrease is mainly in one or two-star hotels, indicating that the overall quality of Chinese hotels has improved.

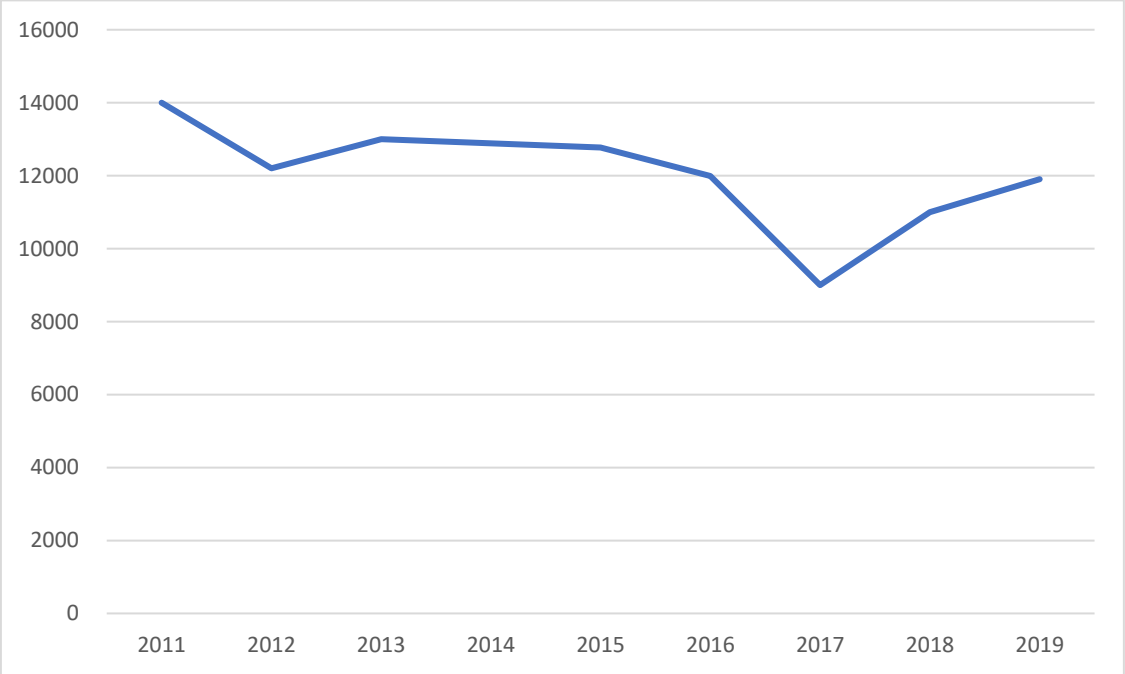

Figure 2.23 - Total number of star hotels

Data source: China Statistical Yearbook 2020

During the COVID-19 pandemic in 2020, the hotel industry in China performed well with an occupancy rate of 58%, ranking first in the world. Due to restrictions on outbound tourism, a considerable proportion of high-net-worth tourists were obtained, resulting in a decrease of about 30% in the occupancy rate of luxury and high-end hotels. In contrast, the United States experienced a higher decline in luxury and high-end hotel occupancy rates, with declines of 48.1% and 52.1%, respectively. During the pandemic, Sanya's hotels performed the best and were one of the few markets with an equal increase in occupancy rates and average room prices.

Finally, funding support is crucial for improving the quality of tourist attractions. However, the current mainstream financing channels do not match the development needs of the tourism industry. For example, China's stock market has a market value of about 80 trillion yuan and is the most active and functional market for financing, but the core assets of tourism such as landscapes, and cultural relics do not belong to any individual or company but to the entire nation. This means that related income cannot be included in listed companies or raised through listing. Regarding traditional bank loans and bonds, banks tend to emphasize collateral, which often translates to high financing costs for small and medium-sized enterprises. Due to the nature of the tourism industry, local governments often intervene in investment through local financing platforms, obtaining a large amount of low-cost loans and bonds. However, this approach increases the government's debt burden and exacerbates the current problem of difficult and expensive financing for small and medium-sized enterprises.

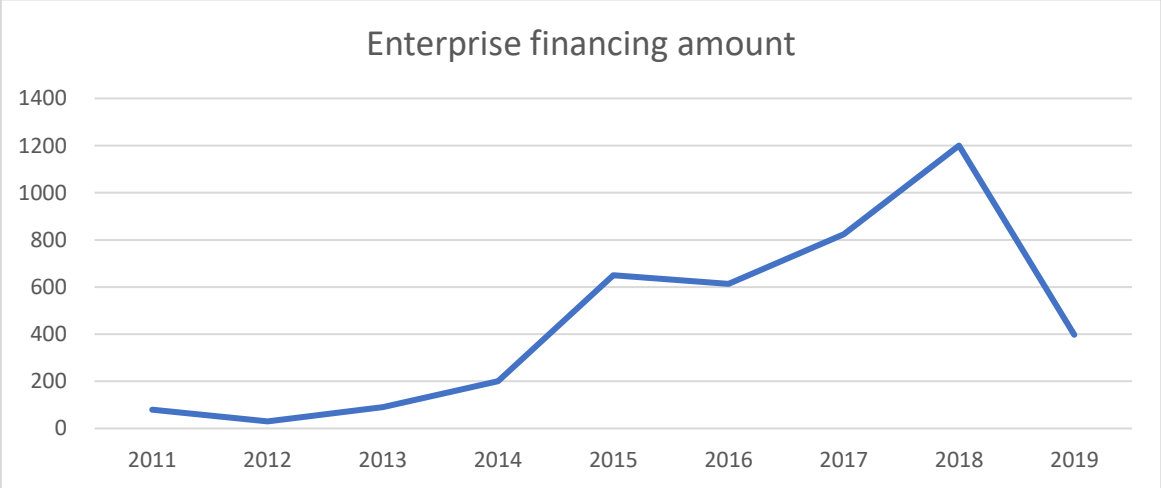

Figure 2.24 - Enterprise financing amount

Data source: Big Data Research Institute

From the trend of financing, as shown in Figure 2.25, the financing amount of Chinese tourism companies has grown rapidly in the past 10 years, from 5.4 billion yuan in 2011 to over 120 billion yuan in 2019, an increase of more than 20 times. However, there was a huge drop in 2020, with the entire industry only financing 36 billion yuan, a year-on-year decrease rate of up to 70%. In addition, the COVID-19 in 2020 has increased financial pressure, leading to some high-quality enterprises, especially small and medium-sized enterprises, being unable to continue operating. This will also lead to existing projects being unable to continue, and new projects unable to start, which will have a significant impact on the Chinese tourism industry. In 2021, the real estate investment trust fund for non-real estate projects, jointly launched by the National Development and Reform Commission and the China Securities Regulatory Commission, included 5A scenic spots in the pilot scope, which to a certain extent eased the problem of difficult and expensive financing for tourism enterprises, and had an important driving effect on improving the competitiveness of Chinese tourism enterprises. This study will analyze the impact of related and supportive industries on the Chinese tourism industry by selecting the indicators of railway passenger volume, civil aviation passenger volume, the number of star-rated hotels, and the amount of financing for cultural and tourism enterprises.

Tourism enterprises are the cells of the tourism industry and the pillar of a tourism power. The ultimate formation of international tourism competitive advantage still needs to be completed by the tourism enterprises of the tourism destination [159,160]. When people travel abroad, they often choose travel agencies to arrange their itinerary and route because travel agencies can help them save a lot of time and money on tickets and transportation, and can also ensure their safety. Therefore, the strength of a country's tourism enterprises determines the international competitiveness of its tourism industry.

As shown in Figure 2.25, with the rapid development of China's tourism industry in recent years, the number of Chinese travel agencies has continued to

grow steadily. In 2002, there were a total of 11,552 travel agencies, it reached 40,652 in 2020, an increase of 350%. Even during the COVID-19 pandemic in 2020, the industry still achieved a year-on-year growth rate of 4.39%. However, there are currently very few high-end travel companies in China. The large travel enterprises in China are mainly state-owned tourism groups represented by China Travel Group, Beijing Tourism Group, and Overseas Chinese Town Group, and OTA (Online Travel Agency) travel companies represented by Ctrip and Meituan. Apart from these, most of the tourism enterprises in China are small and micro-scale enterprises with only a few dozen employees, and the situation of tourism industry in China is regarded as "small, scattered, weak, and poor." Against the backdrop of the digital economy, concepts such as "Internet + tourism" and "cloud tourism" have gradually been applied to tourism service trade. In addition, the outbreak of the COVID-19 has further promoted the shift from offline to online tourism. During the pandemic, some tourism companies in China actively sought transformation, shifting from tourism services to comprehensive services, and promoting digital processes. For example, China Tourism Group relies on its duty-free shops and online businesses to build a new landmark in the Hainan International Tourism Consumption Center, which has made China Tourism Group's duty-free business rank first in the world. Ctrip has launched Planet, which includes three major functions: community, live streaming, and flagship store. Content is the focus, and it closely connects local customs and merchant products, proactively triggering users' tourism needs. The combination of 5G, big data, and the tourism industry is becoming increasingly close, providing valuable assistance for the future recovery of the tourism industry. During the pandemic, thanks to outstanding epidemic prevention policies, OTA companies such as Meituan and Ctrip performed well and achieved net profits that have reached the scale of world-class tourism groups.

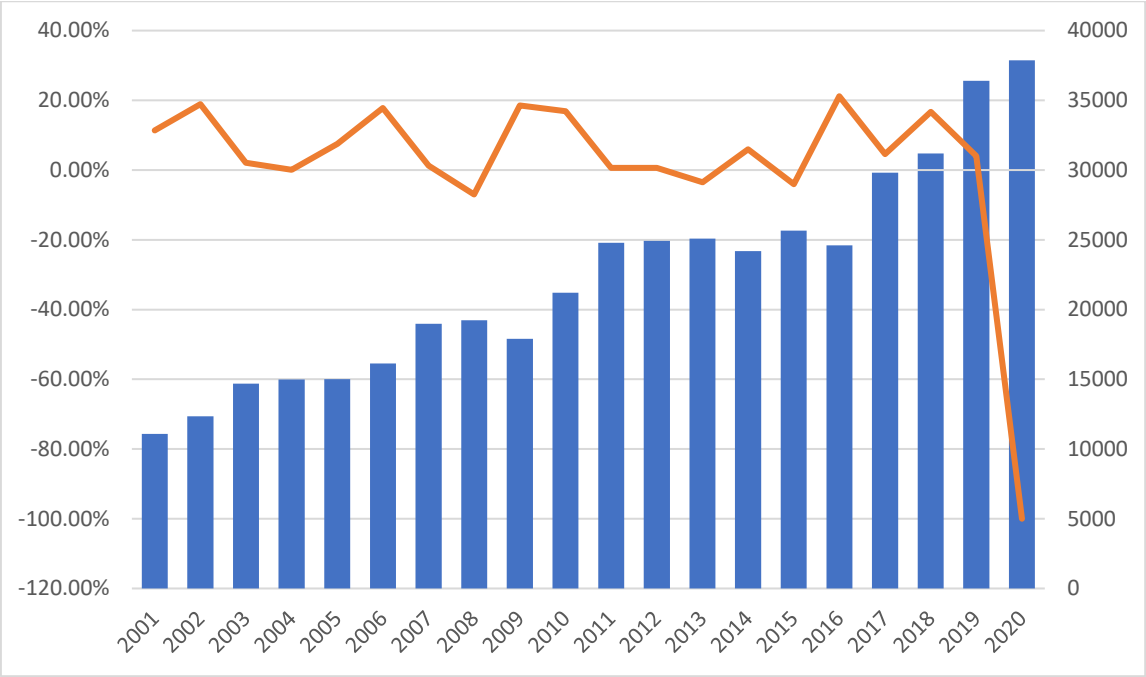

Figure 2.25 - Number travel agencies

Data source: Big Data Research Institute

In the first half of 2020-2021, Meituan's net profits of cultural tourism and hotel reached $117.957 billion and $1.104 billion, respectively, surpassing world tourism giants such as Booking Holdings, Expedia, and Airbnb during the same period. This is of course due to the company's strong ecological benefits, but also due to the huge domestic market. The Chinese tourism industry has a large market of RMB 12 trillion, which is incomparable to other tourism markets. Although large tourism enterprises in China have achieved world-class net profits, their main source of revenue still comes from the domestic market. The level of internationalization development is weak, and they also lack world-class IPs, recognition, and brand influence. They can only be called "large tourism enterprises" rather than "world-class tourism enterprises."

Because corporate competitiveness is difficult to quantify, this study chose the number of travel agencies as a representative indicator of corporate strategic structure and industry competition to analyze its impact on China's international competitiveness of tourism service trade.

As the tourism industry develops rapidly, structural contradictions are increasingly prominent. Macroscopically, the correlation driving effect of tourism

development is weak, and microscopically, the rapid transformation of tourists' aesthetic demands, highly dispersed tourism modes, asymmetric tourism information, and irregular tourism products have led to serious imbalance between supply and demand in the tourism industry. Under the background of the sharing economy, with the deep integration of the Internet, big data, cloud computing, artificial intelligence, virtual reality technology, and physical economy, major online travel agencies (OTAs) such as Ctrip and Qunar, as well as tourism service platforms such as Mafengwo, TripAdvisor, and Qyer, have developed rapidly. They have achieved the connection and sharing of tourist and destination information, promoted the integration of tourism service resources, and synergized with all elements of related industries. As China's tourism industry 3.0 era is approaching, it is urgent to drive the transformation and upgrading of the tourism industry through information technology and service innovation, introduce advanced management ideas and methods to improve the efficiency of tourism industry operation and enhance its overall performance. E-commerce tourism has become an inevitable choice for the sustainable development and transformation and upgrading of China's tourism industry. It has important strategic significance for effectively solving core problems of tourism development, such as "information asymmetry and inadequate supporting elements," continuously improving the level of tourism services, and realizing the co-creation of value for tourism enterprises and tourists[161]. In recent years, the development and application of e-commerce have provided a new competitive platform for the development of the tourism industry, and the competitive elements of the tourism industry have also acquired new connotations based on this.

Just like capital, materials, and labor, information is also an important means of production. In the context of e-commerce, information is even more crucial for the tourism industry. On the one hand, the development and sharing of information resources promote the transformation of means of production in tourism. Firstly, information can directly indicate the target and object of tourism enterprise's marketing activities. Secondly, market supply and demand information, market price

information, etc. can be transmitted quickly, affecting the decision-making of market subjects and forming the feedback and self-regulation mechanism of the market economy to optimize resource allocation. On the other hand, the application of information technology adjusts the original technological structure and labor structure in the industry, directly or indirectly improving the efficiency and economic benefits of enterprises and industries[162].

The internet has affected the lifestyle and personality of modern people. In the e-commerce environment, the consumption concepts and methods of tourists have also changed[163]. The trust of tourists in internet information channels and the gradual acceptance of e-commerce purchasing have led to changes in tourism consumption demand: the demand for tourism products is more diversified and personalized; tourists have a stronger willingness to actively search for information and participate in the design of tourism products; the temporariness and arbitrariness of tourism decisions are enhanced; tourists not only pay attention to the price of tourism products but also the cost-effectiveness ratio. For tourism operators, it is increasingly important to understand the individual needs and preferences of tourists. This requires enterprises to collect data on a large number of customers, combine them, and make decisions based on the information revealed, developing new tourism products to meet the increasingly personalized and segmented market demand. In the e-commerce environment, the ability of tourism operators to grasp market demand in real-time and conduct good information exchange with customers has become the key to obtaining competitive advantages.

The tourism industry is heavily reliant on various sectors, and its supply chain involves a wide range of industries. The formation of tourism competitiveness is the result of collaboration and cooperation among all aspects of the tourism industry, creating a collective competitive force. The development of global e- commerce has created an environment for using information technology to transform industries. It has changed the market structure and the way business is conducted, not only establishing closer relationships between businesses and consumers than in the past, but also greatly enhancing the degree of mutual influence among enterprises in the

industry. This further strengthens the strategic alliances between upstream and downstream enterprises. Today, competition in the tourism industry is no longer solely between enterprises, but more between the various components of the tourism industry system. Therefore, whether the enterprises in the tourism industry can connect with each other and form a large collaborative force is the foundation for improving the industry's competitiveness.

The most typical operating models of Chinese tourism enterprises are "big and comprehensive" and "small and comprehensive", with low levels of specialization and competitiveness. Faced with intense market competition, tourism enterprises are constantly exploring strategic changes to reduce market transaction costs and organizational costs. For example, they are improving management efficiency and market efficiency through information management, expanding scale through integration to bring about economies of scale and scope, and even establishing virtual organizational market relationships through inter-enterprise networks to achieve the specialization of their core business. However, traditional economic and technological conditions are unable to meet the changing needs of enterprises. The development and application of information technology provide a technical support environment for the optimization of tourism industry and enterprise organizational structure, especially the e-commerce that changes the business operation mode of tourism enterprises and enhances cooperation among enterprises. Under the e-commerce environment, the competition in the tourism market further intensifies. Various tourism products and price information can be easily obtained online. Tourism products that lack distinctive features will not demonstrate competitive advantages. Moreover, e-commerce lowers the entry barriers to the tourism market. Whether large or small, tourism enterprises can compete on a more level playing field, intensifying market competition.

In recent years, most tourism destinations have implemented a government-led tourism information development strategy, which is mainly reflected in three aspects: Firstly, in destination promotion, the focus is on presenting a clear and distinct image of the destination, gradually showcasing the tourism city, scenic spots, tourism

enterprises, and products in a rich and orderly manner. Secondly, in marketing activities, the government takes the lead in overall planning while enterprises participate to achieve overall promotion. Thirdly, in the interest mechanism, the government and enterprises jointly invest, reflecting the coordination of interests and interdependence of the entire industry and specific enterprises. In China, the development of tourism e-commerce was identified as one of the four important battles to improve China's international competitiveness in tourism in 2000. In early 2001, the "Golden Travel Project", a tourism informatization project, was launched. Its construction established a good socio-economic and technological environment for the development of the tourism industry. This will improve the efficiency and effectiveness of the entire industry to achieve informatization, laying a foundation for improving the competitiveness of the tourism industry[165].

Compared to other industries, the tourism industry is more in need of e-commerce and is also more easily promoted through it. Tourism products have the characteristics of intangibility and non-storability, and their production and sales are completed during the service process. With e-commerce, there is no need for a delivery process, and the sales process of tourism products is simply a combination of various product information conveyed to people with tourism needs. Therefore, the conditions for the development of tourism e-commerce are suitable[166]. Additionally, the promotion of e-commerce in the tourism industry has a significant impact on improving its competitiveness, mainly reflected in the following areas:

The tourism industry has high interconnectivity. It is a seemingly loose comprehensive industry composed of several industries with completely different natures. The development of the tourism industry involves a wide range of socio-economic structures. E-commerce can quickly integrate various resources, promote cross-industry cooperation and complementary advantages, concentrate scattered profit points, move towards a new level of systemic economy, and form a situation of win-win for travel intermediaries, tourism product producers, and tourists.

E-commerce in tourism helps solve information asymmetry in tourism consumption. The consumption form of tourism products is different from other

commodities. Tourists cannot see the product before consuming it, and consumption, production, and sales occur simultaneously. Due to the serious information asymmetry between tourism agents and tourists, tourists' interests cannot be guaranteed, which not only affects the sales volume of tourism products but also to some extent restricts the further development of the tourism industry. E-commerce can remedy the adverse effects caused by this asymmetric information.

E-commerce in tourism is very suitable for developing individual or small group tourism markets and providing personalized services to tourists. Today's tourists have undergone significant changes in their consumption concepts due to various new ideas, and their consumption have become more rationalized and personalized, tending to choose individual or small group self-guided tours.

The products provided by the tourism e-commerce technology have competitive advantages in prices. The application of e-commerce technology in internal management, online booking, and information consulting can greatly reduce the costs of tourism companies, which helps the rapid growth and development of tourism agents. More importantly, the application of e-commerce technology greatly expands the business scale of tourism enterprises, and large-scale purchases will inevitably further reduce the cost of tourism products, making it more advantageous for tourism companies to survive and develop in the market.

Through tourism e-commerce, the connections between tourism enterprises can be made closer. As the tourism industry develops into the world's largest industry, its economic activities have broken through geographical boundaries, and the trend of global integration is becoming stronger. Its operations face an expanding market and increasingly severe international competition. However, the rapid development of network technology and the e-commerce have also brought many changes and new opportunities to the operation of the tourism industry. To adapt to these changes, tourism enterprises can unite through the Internet, use tourism e-commerce technology to develop strategic alliances, and integrate the resource advantages of various enterprises to achieve economies of scale as well as win-win situation.

The data envelopment analysis method is a systematic analysis method that

evaluates the relative effectiveness or benefit of the same type of units based on multiple inputs and multiple outputs. It is widely used in the analysis of multi-objective decision-making problems. The data envelopment analysis evaluation model is described as follows. Suppose there are n decision-making units (DMUs), and each DMU has m kinds of "inputs" and s kinds of "outputs". Among them, X_{ij} represents the j-th input quantity of the i-th DMU; Y_{ir} denotes the r-th output of the i-th DMU. $X_i=(X_{x1}, X_{x2}, \ldots\ldots X_{im})^T$ and $Y_i=(Y_{i1}, Y_{i2}, \ldots\ldots Y_{is})^T$ are the vector representations of the input and output of each DMU, and a linear programming model can be constructed by introducing slack variables. Regarding a real economic problem, it is difficult for empirical research to judge that the return to scale is constant and the return to scale is variable. As a result, the problem of choosing the CCR model or the BCC model is caused. If the return to scale is constant, the results of the BCC model and the CCR model are consistent; if the return to scale is variable, the BCC calculation results are consistent, and the CCR calculation results are not consistent. Thus, the results of the BCC model with variable returns to scale and constant returns to scale are both consistent and biased. The CCR model is only consistent and upward biased under the condition of constant remuneration. Affected by various factors such as the external environment, the decision-making unit cannot always operate efficiently. Currently, the assumption of constant returns to scale is contrary to the actual situation. Consequently, none of the analyzed decision-making units can maintain the best state, and it is impossible to distinguish between technical efficiency and scale efficiency accurately and efficiently. The assumption of the CCR model is that economies of scale remain constant. The θ value derived based on the CCR model is the comprehensive efficiency value of the decision-making unit. If the constraint condition $\sum \lambda_j = 1$ is added to this model, the model will be transformed into a more reasonable and rigorous BCC model:

$$\begin{cases} \min\left[\theta-\varepsilon\left(\sum_{i=1}^{m}s_i^- + \sum_{r=1}^{s}s_r^+\right)\right] \\ s.t.\ \sum_{j=1}^{n}x_{ij}\lambda_j + s_i^- = \theta x_{ij_o} \qquad i=1,2,\text{L}\ ,\text{m} \\ \sum_{j=1}^{n}y_{rj}\lambda_j - s_r^+ = \theta y_{rj_o} \qquad r=1,2,\text{L}\ ,\text{s} \\ \sum_{j=1}^{n}\lambda_j = 1 \\ \theta,\lambda_j,s_i^-,s_r^+ \geq 0 \qquad j=1,2,\text{L}\ ,\text{n} \end{cases}$$

Formula 2-9

The efficiency value θ based on the BCC model is the pure technical efficiency (Vrste, PTE) of the decision-making unit. Both scale efficiency and pure technical efficiency will affect the overall technical efficiency, and the relationship can be expressed as

$$TE = PTE \times SE$$

Formula 2-10

The higher the PTE value, the higher the pure technical efficiency; the higher the SE value, the higher the scale efficiency. When both PTE and SE reach the optimal value, namely, PTE=1, SE=1, SE will reach the optimal value, and DMU will be the effective value of DEA. The level of comprehensive technical efficiency can reflect the overall efficiency of the business unit while reflecting the level of decision-making ability of the company's senior management and to a certain extent. During the operation and development of the tourism industry, the changes in the economic environment or adjustments in industry policies would all directly influence the scale of the company. There is a severe deviation between the CCR model and reality. In this study, therefore, the objective and comprehensive evaluation of the static efficiency of tourism ecology is completed through the BCC model.

This paper uses Dagum Gini coefficient method to measure the overall differences in ecotourism efficiency and to analyze the source structure of differences. According to Dagum's definition, a country can be divided into K

regions and N provinces, where c and d represent different regions, n_c and n_d represent the number of provinces in c and d respectively, $y_{ri}$and y_{dj} represent the tourism eco-efficiency of any province in c and d respectively, and let's say that X is the average tourism efficiency. The calculation formula is shown in 2-11.

$$G = \frac{1}{2n^2 \bar{X}} \sum_{r=1}^{k} \sum_{d=1}^{k} \sum_{i=1}^{G_c} \sum_{j=1}^{G_d} |y_{ri} - y_{dj}| \quad \text{Formula 2-11}$$

Before the decomposition of Dagum Gini coefficient, the ecological efficiency of tourism in the divided regions should be analyzed, i.e. $\bar{X}_1 \leq \bar{X}_2 \leq \ldots \bar{X}_c \ldots \bar{X}_k$, Where$X_c$ represents the mean value of tourism eco-efficiency in region c.

Dagum decomposed the Gini coefficient into three parts: the first is the contribution of intra-regional (intra-group) gap (G_w), the second is the contribution of inter-regional (inter-group) supervariable net value gap (G_{nb}), and the third is the contribution of inter-regional (inter-group) supervariable density (G_t). The relationship between these three parts is as follows: G=G_w +G_{nb} +G_t. In this paper, G_{nb} represents the difference of tourism eco-efficiency among northeast, east, middle and west regions. The intra-regional gap contribution G_w represents the difference of tourism eco-efficiency among provinces within a region. Supervariable density G_t represents a Gini coefficient remainder of the cross-influence of tourism eco-efficiency among four regions. G_{cc} and G_{dd} represent the Gini coefficient within region c and the Gini coefficient between regions c and d, respectively.

According to the above measurement methods, we can obtain the Dagum Gini coefficient of tourism ecological efficiency in 31 provinces from 2003 to 2020 and decompose the regions.

The Tobit model is also called the truncated regression analysis method. The data envelopment analysis method only solves the evaluation of the relative efficiency of similar decision-making units. Moreover, it mainly focuses on the influence of controllable factors on the efficiency of decision-making units while ignoring the important effect of uncontrollable factors on efficiency. Therefore, it is necessary to further analyze which factors affect the efficiency of the decision-

making unit. Since the results of DEA analysis have a certain interval, directly using the ordinary regression method for estimation will produce biased and inconsistent estimation results. However, the Tobit model can solve this problem well. Tobit models include review regression models and truncated regression models. The review regression model is generally suitable for the left interception of the sample observation value, and the truncated regression model is frequently employed for the interval interception of the sample observation value. Apparently, the truncated regression model is more suitable for the needs of this research. A Tobit regression model is constructed with the pure efficiency of ecotourism (PET) in 31 provinces, municipalities, and autonomous regions across China from 2003 to 2019 as the dependent variable and five indicators (per capita gross domestic product (GDP), environmental pollution control investment (WR), industrial structure (CY), research and experimental development funding (KJ), and tertiary industry output value (CZ) in 31 provinces) as independent variables. Among them, DEA_{it} represents the pure technical efficiency value of ecotourism in the i-th area calculated by the DEA model; t denotes the year; β is the elastic coefficient of each variable; α indicates each fixed effect; ε_{it} refers to a random error term.

$$DEA_{it} = \alpha + \beta_1 GDP_{it} + \beta_2 WR_{it} + \beta_3 CY_{it} + \beta_4 KJ_{it} + \beta_5 CZ_{it} + \varepsilon_{it}$$

$$DEA_{it} = \begin{cases} DEA_{it}, DEA_{it} < 1 \\ DEA_{it}, DEA_{it} \geq 1 \end{cases} \quad \text{Formula 2-12}$$

In this paper, the raw data of Tobit independent variables are standardized using Stata 15 to eliminate collinearity. The original data of the Tobit model is panel data of 31 provinces. Usually, the correlation of panel data is very strong in actual research. Variable missing will have a great impact on the model results. The magnitude of this influence depends on whether there is a strong correlation between the omitted explanatory variables and the remaining explanatory variables. Therefore, before the regression analysis, the model needs to be tested to observe whether the model is a random-effects model or a fixed-effects model. In this article, Stata 15 is employed to perform the Hausman test on the model, the null hypothesis is rejected, and an individual fixed-effects model is established.

Table 2.9 - Sample analysis

Indicators	Number of samples	Minimum	Maximum	Mean	Standard Deviation
Total tourism revenue (ten thousand yuan)	558	578.7	20839250.8	798540.5	1437939.4
Number of star hotels (number)	558	2	1169	341.62	223.2
Total number of travel agencies	558	11	3481	784.1	598.5
Total number of tourist attractions	558	0	1292	195.6	192.5
Persons employed in the tourism industry	558	2794	829017	85844.4	77565.9
Waste water (ton)	558	612	1660200	204631.8	290761.7
Waste gas (ton)	558	749	2003000	561155	453921.6
Solid waste (tons)	558	1	6288789	174100	612554

Through descriptive statistics of the data, it is found that there are 558 samples in total, and the difference between the minimum value and maximum value of each index is very large, that is, the standard deviation is very large, indicating that each index has a huge difference in every city or every region. Especially for tourism revenue (including domestic and international income), some regions earned 5.788 million yuan, while the best regions earned 20.8392.5 million yuan, a difference of 30,000 times.

According to MAXdea calculation, the average value of technological benefit of China's ecotourism during the 18 years from 2003 to 2020 is 0.6633, and the highest value is 0.7833 in 2018, which is still at a relatively low level. The comprehensive benefit value of 2017 was only 0.1757. It can be seen from the data that the statistical caliber of tourist attractions changed in 2017, and the number of all tourist attractions was included instead of the number of star attractions. According to the DEA-Malquist model, from 2003 to 2020, the average change of technological progress is greater than 1, which is increasing year by year, with an annual increase of 22%, indicating that during this period, the increasingly fierce competition makes ecotourism pay more attention to the input of advanced technology represented by informationization. However, the mean value of pure technical efficiency (PTE) change and scale efficiency (SE) change is smaller than

1, indicating that PTE and SE regressed slightly during the 8 years, and the effective degree of existing technology use is low, and the total tourism input is in a state of scale diseconomy. The main reason may be that star hotels and travel agencies are mainly concentrated in large and medium-sized cities in the east, which leads to the decrease of the overall return to scale, and the economies of scale contained in the input production factors have not been fully explored. In conclusion, since the positive effect of technological progress changes exceeds the negative effect of pure technical efficiency changes and scale efficiency changes, the TE of China's tourism industry showed an upward trend from 2003 to 2020, with an average annual increase of 5.6%, and the intensification degree of tourism development gradually improved. It can also be seen from Figure 2.26 that the change trend of TE of China's tourism industry is roughly the same as that of technological progress, while the change of pure technical efficiency and scale efficiency has no obvious influence on TE change, indicating that technological progress change is the main source of TE rise.

Table 2.10 - Efficiency value (year)

Year	TE	SE	PTE
2003	0.5771	0.6947	0.4153
2004	0.6261	0.7162	0.4566
2005	0.6604	0.7782	0.5268
2006	0.7338	0.8419	0.6135
2007	0.6207	0.6798	0.4093
2008	0.6573	0.7437	0.4769
2009	0.6920	0.7547	0.5135
2010	0.5845	0.6938	0.3974
2011	0.6068	0.7014	0.4303
2012	0.6918	0.8094	0.5658
2013	0.7410	0.8157	0.6069
2014	0.7074	0.7169	0.5118
2015	0.6657	0.7003	0.4565
2016	0.6579	0.6768	0.4399
2017	0.5553	0.2529	0.1757
2018	0.7833	0.7593	0.5852
2019	0.7058	0.6363	0.4578
2020	0.6724	0.5646	0.4370
Mean	0.6633	0.6965	0.4907

Through the average efficiency and comprehensive evaluation of 31 provinces in China, the mean value of technical benefit is 0.6632, the mean value of scale benefit is 0.6964, and the mean value of comprehensive benefit is 0.4709. The ranking of comprehensive benefit is as follows (Table 2.11). Shanghai, Beijing and Hainan have the highest comprehensive efficiency, and are considered as strong and effective DEA. It shows that the ecological environment is well protected and the waste is less everywhere. The bottom three provinces are Qinghai, Inner Mongolia and Gansu, which have low comprehensive efficiency and are considered non-DEA effective.

From the comprehensive technical benefit (value less than 1), it can be seen that the input and output structure of each province is unreasonable in terms of resource allocation ability and resource use efficiency, and the relative benefit fails to reach the optimum, which is mainly reflected in the excessive number of tourism practitioners, the ultra-high emission of three wastes, and the existence of different degrees of input redundancy.

From the perspective of technical benefit, the application of management and information technology is not deep enough, so the production efficiency is low (value is less than 1). The input of information technology, especially tourism e-commerce, is not fully utilized, and the output maximization is not achieved under the given input combination. From the scale efficiency, except Jiangsu Province in 2003, almost all the others showed increasing returns to scale, so they could increase the input to increase the scale efficiency. In 2015, Jiangsu, Zhejiang, Anhui, Shandong, Henan, Hubei, Guangdong and Yunnan had diminishing returns to scale and excessive expansion. In 2016, Jiangsu, Zhejiang, Shandong, Henan, Hubei and Guangdong all had decreasing returns to scale and excessive expansion.

The average comprehensive technical efficiency of eco-tourism in China during the 18 years from 2003 to 2020 is 0.4709, from which it can be seen that the ratio of actual output and ideal output of eco-tourism is 47.09%, indicating that there is still a certain gap between the comprehensive efficiency of eco-tourism in China

and that in developed countries.

Table 2.11 - Efficiency value(area)

area	TE	SE	PTE	Rank
Ahui	0.5693	0.7299	0.4097	18
Beijing	0.9143	0.9208	0.8471	2
Fujian	0.5686	0.7911	0.4705	13
Gansu	0.5373	0.4608	0.2499	30
Guangdong	0.8431	0.8719	0.7501	5
Guangxi	0.4821	0.6856	0.3323	22
Guizhou	0.6984	0.5802	0.4472	15
Hainan	1.0000	0.7895	0.7895	3
Hebei	0.3777	0.7011	0.2713	28
Henan	0.5988	0.7734	0.4956	11
Heilongjiang	0.6779	0.4498	0.3067	23
Hubei	0.4661	0.8258	0.4020	19
Hunan	0.5391	0.8067	0.4508	14
Jilin	0.6836	0.3879	0.2724	27
Jiangsu	0.7562	0.8586	0.6392	6
Jiangxi	0.6137	0.7522	0.4854	12
Liaoning	0.4252	0.6663	0.3046	24
Neimeng	0.4284	0.5792	0.2376	31
Ningxia	1.0000	0.5161	0.5161	10
Qinghai	0.9786	0.2543	0.2533	29
Shandong	0.5459	0.8020	0.4436	17
Shanxi	0.4614	0.6232	0.3040	25
Sanxi	0.4952	0.7588	0.3862	20
Shanghai	0.9761	0.9167	0.9159	1
Sichuan	0.6374	0.8124	0.5451	9
Tianjin	0.9827	0.6071	0.5960	7
Xizang	1.0000	0.7823	0.7823	4
Xinjiang	0.4810	0.5947	0.2964	26
Yunnan	0.5062	0.7189	0.3788	21
Zhejiang	0.6991	0.8248	0.5741	8
Chongqing	0.6187	0.7485	0.4444	16
Mean	0.6632	0.6964	0.4709	

By analyzing the trend of eco-tourism efficiency, it can be seen that the trend can be divided into five stages (Figure 2.26). The first stage is from 2003 to 2006, and the change of eco-tourism efficiency value in this stage shows an upward trend, from 0.4152 in 2003 to 0.6135 in 2006. In 2007, the comprehensive technical efficiency of ecotourism was 0.4092, which obviously decreased. The second stage

is from 2008 to 2009, which shows an upward trend of fluctuation again. In 2008, it was 0.4769, and in 2009, it was 0.5135, which increased by 0.0677 and 0.1043 respectively compared with 2007. In 2010, it reached a low point again. The fourth stage is from 2011 to 2014, which shows an increasing trend. The fourth stage is from 2015 to 2017. It is worth mentioning that the comprehensive technical efficiency of ecotourism decreased to 0.1757 obviously in 2017, and then increased again. The fifth stage shows a slow downward trend. From the perspective of time span, the efficiency of ecotourism in China is not obvious, which is related to the importance of various places. According to the comprehensive analysis, the efficiency of 2017 is obviously too low, which is related to the statistical standards of tourist attractions. Moreover, for the development of tourism, the input in the current year may not produce output in time, that is to say, the input and output are lagging behind.

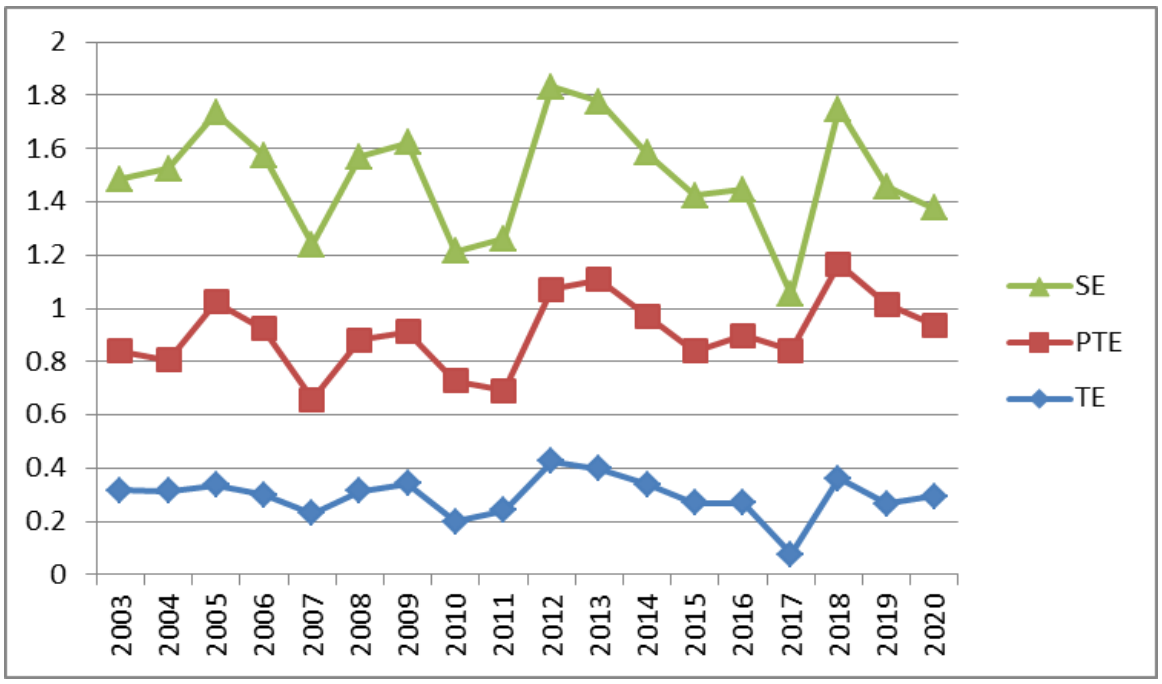

Figure 2.26 – Spatial distribution pattern of the three efficiencies

This uses GIS mapping software and adopts the natural discontinuous point grading method to divide the comprehensive efficiency of ecotourism into five levels: high efficiency value area, second high efficiency value area, medium efficiency value area and low efficiency value area. By presenting the average efficiency of ecotourism development from 2003 to 2020 and the inter-annual variation of tourism

efficiency in 2007, 2010 and 2017, the spatial distribution pattern of the three efficiencies was studied (Figure 2.27).

Figure 2.27 – Spatial distribution pattern of the three efficiencies

As can be seen from the picture above: In terms of the spatial pattern of comprehensive efficiency, there are obvious inter-provincial differences. The efficiency of the eastern region is higher than that of the western region, and the eastern region is obviously higher than that of the western region. From the horizontal comparison, the highest tourism efficiency value of Shanghai from 2003 to 2020 is 0.9158, which may be because Shanghai, as China's economic and financial center, has unique and rich ecological tourism resources. With strong attraction, it attracts tourists from all over the country, followed by Beijing (0.8471) and Guangzhou (0.7501). Inner Mongolia has the lowest eco-efficiency value, which is only 0.2345, with a large gap. Especially in 2007, 2010 and 2017, the ecotourism efficiency was low, which was the serious problem of desertification caused by overgrazing in Inner Mongolia. In terms of spatial pattern of scale efficiency, inter-provincial differences are not obvious. The efficiency of the eastern region is higher than that of the western region, and the eastern region is slightly higher than that of the western region. From the horizontal comparison, the highest tourism efficiency

value of Shanghai from 2003 to 2020 is 0.9158, which may be because Shanghai, as China's economic and financial center, has unique and rich ecological tourism resources. With strong attraction, it attracts tourists from all over the country, followed by Beijing (0.8471) and Guangzhou (0.7501).

Figure 2.28 – Spatial distribution pattern of the three efficiencies

Inner Mongolia has the lowest eco-efficiency value, which is only 0.2345, with a large gap. Especially in 2007, 2010 and 2017, the ecotourism efficiency was low, which was the serious problem of desertification caused by overgrazing in Inner Mongolia.

Clear difference from the technical efficiency of spatial pattern, the provincial, not present situation, in the west of the east is higher than the horizontal comparison, in 2003-2020 Shanghai tourism is the most efficient efficiency value of 0.9158, this may be due to Shanghai as China's economic and financial center, unique and rich ecological tourism resources, has a strong appeal, attracts tourists from all over the world, It was followed by Beijing (0.8471) and Guangzhou (0.7501). Inner Mongolia has the lowest eco-efficiency value, which is only 0.2345, with a large gap. Especially in 2007, 2010 and 2017, the ecotourism efficiency was low, which was the serious problem of desertification caused by overgrazing in Inner Mongolia.

Figure 2.29 – Spatial distribution pattern of the three efficiencies

Dagum Gini coefficient decomposition method is used to analyze the regional differences of ecotourism efficiency in China, and the Gini coefficient (G) is decomposed into three parts: the contribution of intra-regional gap (Gw), the contribution of inter-regional gap (Gnb) and the contribution of excess density caused by cross-terms between regions (Gt). According to the general regional division standards, it is divided into four major regions: northeast, east, central and west. Table 2.12 indicate the northeastern, eastern, central, and western regions respectively. The overall Gini coefficient of ecotourism efficiency in the sample period shows an unbalanced trend. In terms of the total amount, the Gini coefficient in 2004 and 2009 is equal to 1, and the Gini coefficient in other years is less than 1. Although there is a big difference, the average value is more than 0.25. From 2003 to 2020, there was a large fluctuation, with a peak value of 1 and a minimum value of 0.232. By observing the contribution of the three factors to the overall Gini coefficient, the inter-group gap is the main factor causing the tourism gap. In 2004, the contribution rate of inter-group difference was 93.33%, far higher than the other two differences. Therefore, narrowing the gap between sectors is the key to solve the spatial imbalance of China's eco-tourism development, and making up the weak

points is an important way to avoid the continuous expansion of the regional gap in eco-tourism efficiency in China.

Table 2.12 - Dagum Gini value

Year	Total	Differences between groups						Contribution		
		(2-1)	(3-1)	(3-2)	(4-1)	(4-2)	(4-3)	Gw	Gnb	Gt
2003	0.2525	0.2808	0.2407	0.2378	0.2863	0.2651	0.2312	30.2262%	15.9403%	53.8335%
2004	0.9677	1.0000	1.0000	0.4882	1.0000	0.4483	0.4717	6.6667%	93.3333%	0.0000%
2005	0.3492	0.3013	0.1174	0.3392	0.3913	0.3624	0.4177	30.5453%	40.9974%	28.4573%
2006	0.4346	0.4389	0.4420	0.4595	0.3868	0.4422	0.4336	30.3361%	16.4358%	53.2281%
2007	0.3004	0.3526	0.2570	0.3695	0.2058	0.3210	0.3077	26.7984%	39.0837%	34.1178%
2008	0.3082	0.4402	0.3596	0.3070	0.3218	0.3217	0.3374	25.2843%	45.1681%	29.5476%
2009	0.9677	1.0000	0.3512	1.0000	0.3574	1.0000	0.3141	30.0000%	70.0000%	0.0000%
2010	0.2092	0.3372	0.1980	0.2427	0.3500	0.1864	0.2223	24.8340%	44.8277%	30.3383%
2011	0.2842	0.2873	0.3269	0.3193	0.3046	0.2740	0.3006	28.2556%	25.9745%	45.7699%
2012	0.2968	0.3019	0.3440	0.3278	0.3132	0.2864	0.3155	28.2156%	23.3611%	48.4233%
2013	0.3100	0.3072	0.3795	0.3158	0.3618	0.3197	0.2864	28.0173%	36.2609%	35.7217%
2014	0.3776	0.4454	0.4682	0.3643	0.4669	0.3564	0.3840	26.9348%	15.2974%	57.7678%
2015	0.2948	0.3624	0.4040	0.2930	0.4044	0.2587	0.2917	25.0630%	27.7268%	47.2102%
2016	0.3193	0.3267	0.3631	0.3258	0.3325	0.3080	0.3548	29.1925%	20.6250%	50.1825%
2017	0.2320	0.2615	0.2733	0.2763	0.2862	0.1961	0.2982	26.6465%	35.6962%	37.6573%
2018	0.2304	0.1843	0.2677	0.2296	0.2846	0.2518	0.2508	25.6184%	35.8920%	38.4896%
2019	0.3566	0.3980	0.3708	0.3676	0.3676	0.3797	0.3429	28.4061%	18.9482%	52.6457%
2020	0.4252	0.4221	0.3871	0.4026	0.4475	0.4442	0.4291	28.4055%	19.4465%	52.1480%

In order to have a deep insight into the evolution trend and source structure of the spatial distribution difference or imbalance of ecotourism efficiency in China, this paper uses Dagum Gini coefficient method to measure the ecotourism efficiency in China during the sample period. According to the Dagum Gini coefficient measurement result of China's ecotourism efficiency, the overall Gini coefficient increased from 0.2525 in 2003 to 0.4252 in 2020, with an increase of 68.4%, indicating that the overall difference in China's ecotourism efficiency is shrinking and expanding. In addition, the stage characteristics of the overall difference change are obvious. The overall difference in 2003 and 2009 is large, while the difference in other years is small. The overall difference in China's ecotourism efficiency has a small increase and decrease trend.

From the perspective of the internal Gini coefficient of each region, the Gini coefficient of northeast China and eastern China basically maintained around the

mean value of 0.3 in other years except for the big gap in 2004, indicating that the difference of ecotourism in northeast China is relatively small, and the income and carbon emission are balanced.

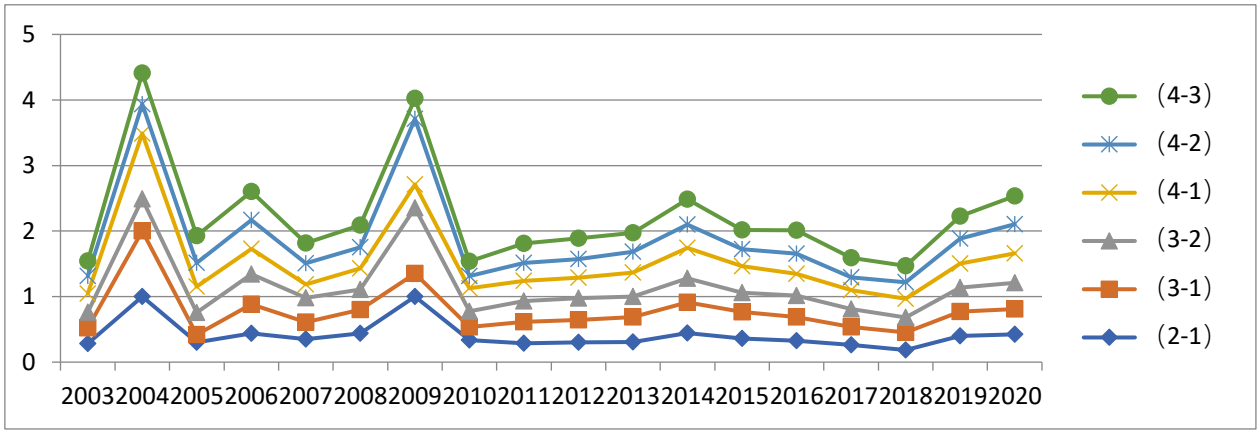

Figure 2.30 – Dagum Gini value (year)

The Gini coefficient of ecotourism in the central and western regions has a large fluctuation range, and its mean value is 0.534 and 0.525, respectively, which are much higher than those in the northeast and eastern regions. This suggests that the central and western provinces should pay more attention to the coordination and linkage between provinces within the region while improving their own ecotourism in the future. The figure 2.31 depicts the evolution characteristics of different sources and contribution rates of ecotourism efficiency in China.

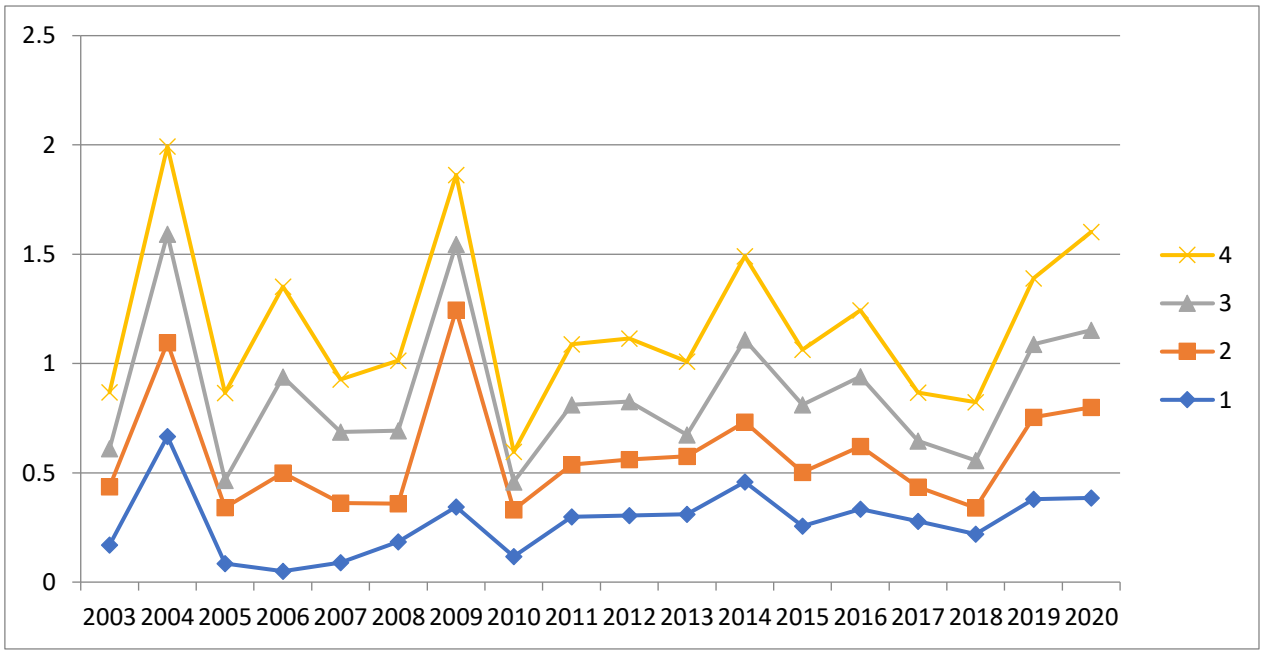

Figure 2.31 – Dagum Gini value (area)

The tourism eco-efficiency for the cross-sectional data of 31 provinces in China from 2003 to 2019 is calculated based on the DEAP2.1 software package. Table 2.13 exhibits the evaluation results of tourism eco-efficiency in various provinces in China. From the perspective of the whole of China, the overall eco-efficiency level of tourism presents a trend of slight fluctuations (average technical efficiency (effch=1.3330), technical progress index (techch=1.8211), pure technical efficiency (pech=1.2298), average scale efficiency (sech=1.0320), average total factor efficiency (tfpch=1.9190)).

However, pure technical efficiency is not high, indicating that technical investment is still needed, and there is still much room for improvement in the future. From the perspective of each province, each eco-efficiency exceeds 1. This suggests that the construction of tourism eco-efficiency has developed in recent years, and the tourism industry is transforming towards a healthy and sustainable direction. The tfpch values of Liaoning, Beijing, Qinghai, Shanghai, and Anhui rank in the top five. This shows that the efficiency of eco-tourism is not necessarily related to the degree of economic development of a region and is related to the degree of environmental protection. The effch values of Shandong, Sichuan, and Liaoning rank in the top three. The technical efficiency of these three regions is relatively high. Shanghai, Guangdong, and Fujian's techch, an indicator of technological progress, ranks in the top three.

Table 2.13 – Evaluation results of tourism eco-efficiency in various provinces in China from 2003 to 2019

Area	effch	techch	pech	sech	tfpch
Beijing	1.0782	1.8924	1.0228	1.0222	3.4950
Tianjin	1.0081	1.7443	0.9918	1.0019	1.5029
Hebei	1.6769	1.8735	1.3439	1.0514	1.4088
Shanxi	1.0402	1.9829	1.0173	1.0055	2.4092
Nei Mongol	1.1056	1.6407	1.0448	1.0440	1.5463
Liaoning	1.8158	1.6482	1.4225	1.0868	4.0042
Jilin	1.0572	1.4516	1.0533	1.0234	1.9988
Heilongjiang	1.5460	1.6664	1.3574	1.1098	2.1561
Shanghai	1.1150	2.4764	1.1155	1.0007	2.5037

Jiangsu	1.2184	1.9244	1.3122	1.0244	1.5933
Zhejiang	1.4982	2.0179	1.3175	1.0559	1.5991
Anhui	1.1234	1.5675	1.0463	1.0195	2.5076
Fujian	1.5922	2.4356	1.4484	1.0295	1.6727
Jiangxi	1.3711	1.9923	1.4057	0.9998	1.8893
Shandong	2.7615	1.8068	1.6166	1.1042	2.2825
Henan	1.5612	2.1412	1.5968	1.0200	1.5981
Hubei	1.6841	1.8811	1.4448	1.0351	1.5033
Hunan	1.2402	1.9756	1.1725	1.0153	1.6871
Guangdong	1.5626	2.4184	1.5800	1.0284	1.8120
Guangxi	1.2707	1.9016	1.2797	1.0170	1.6937
Hainan	1.0200	1.3410	1.0062	1.0060	1.4153
Chongqing	1.0611	1.7219	1.0278	1.0101	1.5893
Sichuan	1.7889	1.9618	1.7268	1.0174	1.2275
Guizhou	1.2139	1.6344	1.2158	0.9923	1.6132
Yunan	1.1424	1.6271	1.0776	1.0456	1.5032
Shanxi	1.1627	1.9312	1.0632	1.0271	2.0591
Gansu	1.0316	1.4363	0.9719	1.0315	1.5847
Qinghai	1.1884	1.5669	1.1762	1.0764	2.5120
Xizang	1.0000	1.5617	1.0000	1.0000	1.5617
Ningxia	1.0710	1.6603	1.0000	1.0710	1.4926
Xinjiang	1.3164	1.5747	1.2331	1.0205	2.0665
mean	1.3330	1.8211	1.2298	1.0320	1.9190

From the perspective of the dynamic development from 2003 to 2019, the average efficiencies in all of China have exceeded 1, which is basically at a relatively high level. This reflects that the construction of tourism ecology is effective, and technological progress has played a certain role.

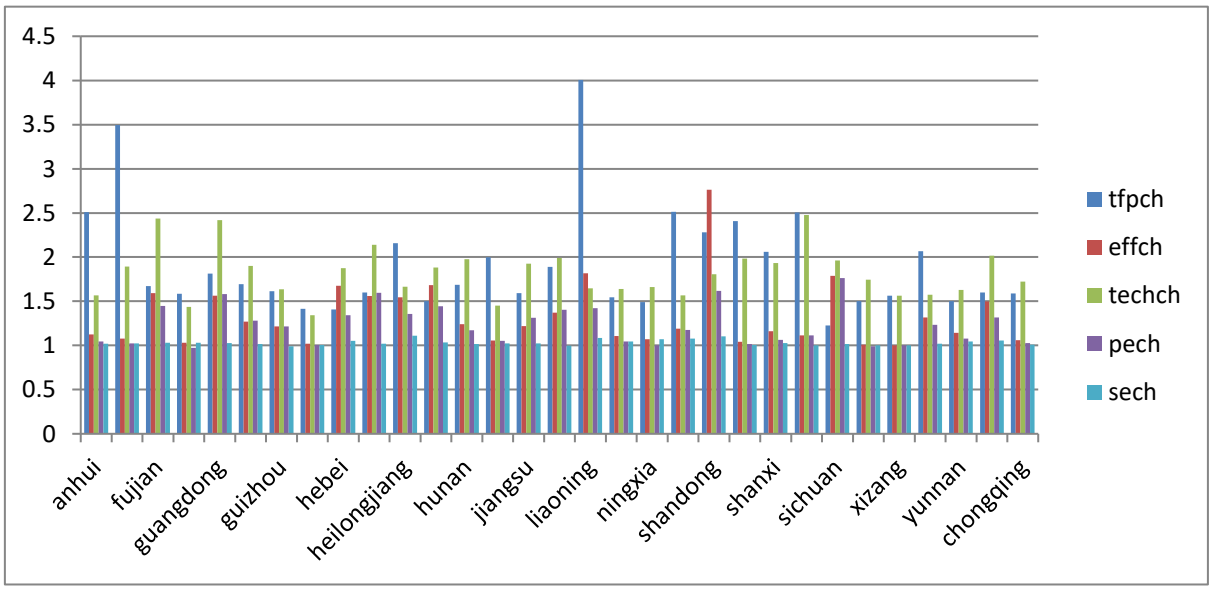

Figure 2.32 – efficiency distribution

These three cities have significant technological progress. The pure technical efficiency pech and the average scale efficiency sech of each region are relatively balanced. Thus, the difference in eco-efficiency is not very large, though the distribution of tourism areas between provinces is uneven. According to a comprehensive analysis, the level of tourism development in China has basically maintained a balance, and all of them are using their own resource advantages to develop the local tourism industry and have made considerable progress in ecological protection.

Regarding changes in various provinces (Table 2.14), the top five in spatial distribution are Liaoning, Beijing, Qinghai, Anhui, and Shanghai. There are no eastern, central, and western effects mentioned by Huang Yuting [China Tourism Eco-Efficiency Evaluation and Influencing Factors Research 2020 Based on DEA Model] in the space. Generally, it is related to technological progress and environmental protection in this area. From the perspective of time effects, the three phases 2009 - 2010, 2010-2011, and 2011-2013 have the best efficiency. This is closely associated with the pollution control invested by the state in various provinces.

Table 2.14 – Annual total factor efficiency and efficiency rankings of provinces

Area	2013~2014	2014~2015	2015~2016	2016~2017	2017~2018	2018~2019
Anhui	0.257142	0.924687	0.234848	1.27013	0.318541	0.810619
Beijing	1.37139	1.03673	0.474778	1.48384	0.99022	1.34055
Fujian	0.594905	0.958226	0.299756	2.44872	0.316632	3.19742
Gansu	0.445226	0.787686	0.390469	2.38802	1.22892	0.936446
Guangdong	0.898557	0.748686	0.934336	1.33824	0.932365	1.34032
Guangxi	0.487073	0.93396	0.33633	1.81205	1.20558	0.999169
Guizhou	0.901354	0.253435	0.314026	5.94212	0.452785	0.998906
Hainan	1.30489	1.7633	0.442208	2.53651	0.24015	1.65487
Hebei	0.46729	0.706675	0.242426	2.86492	1.28824	0.931218
Henan	0.560196	1.56635	0.102242	7.65666	0.656811	0.832181
Heilongjiang	0.110286	8.26146	0.844428	1.25281	0.879297	1.22321
Hubei	0.292152	0.848849	0.21388	3.78522	0.596489	1.10703
Hunan	0.295192	0.680253	0.464233	1.96191	1.02841	0.989895
Jilin	0.323903	0.994783	0.21872	4.0963	0.502362	0.852281
Jiangsu	0.62316	0.480578	0.728559	2.48051	0.877113	0.950935
Jiangxi	0.586857	1.05589	0.433936	7.5342	0.281322	1.7243
Liaoning	2.05628	0.832787	0.266375	3.01735	0.876603	0.952788
Nei Mongol	0.429755	1.54147	0.095709	4.09642	1.00555	0.644952
Ningxia	0.758799	0.981782	0.128433	7.19717	1.26323	0.741901
Qinghai	0.844393	1.63923	0.491952	6.23972	0.623157	0.85982
Shandong	0.691499	1.04472	0.245561	2.67475	0.794041	0.852601
Shanxi	0.389419	0.727996	0.164241	4.46281	1.40548	1.25079
Shaanxi	0.320044	0.888795	0.424288	2.0122	1.00934	1.04756
Shanghai	0.547936	1.16114	0.504345	1.20769	1.235	0.887926
Sichuan	0.569236	0.886989	0.211012	2.76366	1.12876	0.742477
Tianjin	0.598538	0.91891	0.363328	3.06262	1.00737	0.934058
Tibet	1.37087	1.76482	0.440408	4.63782	0.827367	1.46119
Xinjiang	0.336775	0.926983	0.385521	2.21701	1.31404	0.54405
Yunnan	0.313955	0.715267	0.349215	2.14488	0.959049	0.939672
Zhejiang	0.453572	1.29838	0.210683	3.15526	0.897412	0.613694
Chongqing	0.508562	0.798086	0.318516	2.34389	1.17195	0.890268
Average	0.635781	1.229965	0.363702	3.293078	0.881083	1.072681
Area	2009~2010	2010~2011	2011~2012	2012~2013	2013~2014	2014~2015
Anhui	1.43779	25.4896	0.390514	0.664336	1.38535	1.15034
Beijing	0.832388	38.8706	0.505506	0.834132	0.772053	0.814439
Fujian	0.818133	10.4657	0.732075	0.847126	0.862243	1.53584
Gansu	0.60265	10.7894	0.251972	0.835925	1.33269	1.08434
Guangdong	0.607803	15.3143	0.657431	1.00685	1.44626	0.728129
Guangxi	1.01748	11.5306	0.637519	1.39192	0.227829	2.03403
Guizhou	2.30129	6.93077	0.993829	0.906566	0.837767	0.653176
Hainan	0.962783	5.42138	0.479348	1.16062	0.938904	0.82668

Hebei	0.555896	6.218	1.07907	0.583607	2.17983	0.850455
Henan	1.20154	4.61346	0.91953	0.933501	0.923135	0.850545
Heilongjiang	0.742408	11.7191	0.691681	0.690173	1.17594	0.682578
Hubei	0.827542	9.78351	0.441126	1.0092	1.0228	0.930073
Hunan	0.634962	13.811	0.230179	1.09687	1.24475	1.05324
Jilin	1.00322	16.5675	0.483056	1.17659	0.662551	1.08381
Jiangsu	0.760736	11.668	0.621076	0.894625	1.10181	0.796124
Jiangxi	1.34152	9.68299	0.235182	1.12099	0.907319	1.06174
Liaoning	0.702552	46.8601	0.160012	0.804626	0.953095	1.28453
Nei Mongol	0.912982	6.11734	0.900281	0.950929	1.11115	0.946703
Ningxia	0.955824	2.70366	0.746219	0.909807	0.969287	0.944689
Qinghai	0.561677	17.8063	0.176856	1.09196	1.35548	1.38031
Shandong	0.941824	21.4391	0.231818	0.759371	1.46374	0.736039
Shanxi	0.784378	22.6966	0.468815	0.731558	1.05567	0.989833
Shaanxi	0.621623	19.8456	0.381683	0.831287	0.610979	1.05255
Shanghai	0.544969	26.3933	0.730832	0.782718	0.811192	0.851555
Sichuan	1.41243	4.89485	1.26095	0.610014	0.555793	1.21014
Tianjin	0.902546	6.87026	0.384697	0.949067	1.05711	0.995864
Tibet	1.29191	2.12151	1.31562	0.72814	1.21504	1.1628
Xinjiang	1.30566	16.9511	0.469657	0.307536	4.36202	0.851174
Yunnan	0.93047	9.32542	0.493701	0.693019	1.22847	1.80656
Zhejiang	0.776599	11.8434	1.00751	0.96574	0.842695	0.892926
Chongqing	0.783357	11.0421	0.761296	0.7179	0.889878	0.890434
Average	0.937966	14.05763	0.607711	0.870539	1.145253	1.036505
Area	2015~2016	2016~2017	2017~2018	2018~2019	Mean	Rank
Anhui	1.57816	0.216106	3.66058	0.333557	2.507644	4
Beijing	0.743094	0.131787	4.93264	0.785062	3.494951	2
Fujian	0.899516	0.902367	0.68669	1.19759	1.672684	16
Gansu	0.825153	1.50023	1.28746	0.668379	1.584685	22
Guangdong	0.573966	0.801191	1.03845	0.625071	1.811997	13
Guangxi	1.74848	0.891557	1.19717	0.647974	1.69367	14
Guizhou	1.48699	1.01022	1.46675	0.360432	1.613151	17
Hainan	0.674422	1.41028	1.30077	1.52844	1.415347	29
Hebei	0.526304	2.59664	0.482893	0.966628	1.408756	30
Henan	1.23278	0.571744	2.11574	0.832621	1.598065	19
Heilongjiang	0.390644	4.43086	0.954208	0.449089	2.156136	8
Hubei	0.72987	1.09033	0.987826	0.387056	1.50331	25
Hunan	0.97872	0.993617	1.23835	0.291488	1.687067	15
Jilin	0.75253	0.604421	1.94334	0.716212	1.998849	11
Jiangsu	1.25771	0.352421	1.38771	0.51156	1.593289	20
Jiangxi	1.36764	0.406565	2.38049	0.107187	1.889258	12
Liaoning	0.450221	2.85897	0.622584	1.36769	4.00416	1
Nei Mongol	1.62387	1.21706	0.980218	2.16616	1.546284	24
Ningxia	1.52121	1.4344	1.38271	1.24171	1.492552	28

Qinghai	1.07822	3.32453	1.11024	1.6088	2.51204	3
Shandong	0.651908	3.14981	0.332794	0.511138	2.282545	7
Shanxi	0.643248	0.64217	1.69653	0.436892	2.409152	6
Shaanxi	1.08842	0.996666	1.05819	0.757061	2.059143	10
Shanghai	0.917384	2.17422	0.422735	0.886441	2.503711	5
Sichuan	0.518357	1.48718	1.23152	0.156761	1.227508	31
Tianjin	0.608613	0.52643	3.4437	1.42255	1.502854	27
Tibet	1.97019	0.545147	3.01567	1.11878	1.561705	23
Xinjiang	0.420346	0.726908	1.62087	0.324866	2.066532	9
Yunnan	0.927803	0.98656	0.936557	1.30008	1.503167	26
Zhejiang	0.664711	0.74978	0.933331	0.280604	1.599144	18
Chongqing	1.16833	1.11536	0.941541	1.0873	1.589298	21
Average	0.968349	1.28534	1.509363	0.808877	1.918989	

Quantitative models should be adopted for quantitative analysis to further analyze the influencing factors affecting the eco-efficiency of China's tourism. In this article, a panel data model for 2003-2019 is established to explore the relationship between various variables. There are many factors influencing the eco-efficiency of tourism. The following factors are selected for analysis: regional GDP per capita in 31 provinces, which measures the level of regional economic development; environmental pollution control investment (industrial pollution control investment is selected according to the availability of data) as a proportion of the regional GDP (WR), which measures the regional environmental protection and ecological policies; industrial structure (CY): the proportion of the regional secondary industry *40% + the proportion of the tertiary industry * 60%; research and experimental development funding (investment in research and experimental development of industrial enterprises above designated size by region) as a proportion of regional GDP (KJ), which measures the technological level of a region and reflects the investment in environmental protection technology; Tertiary Industry Output Value (CZ), which represents the level of regional tourism services.

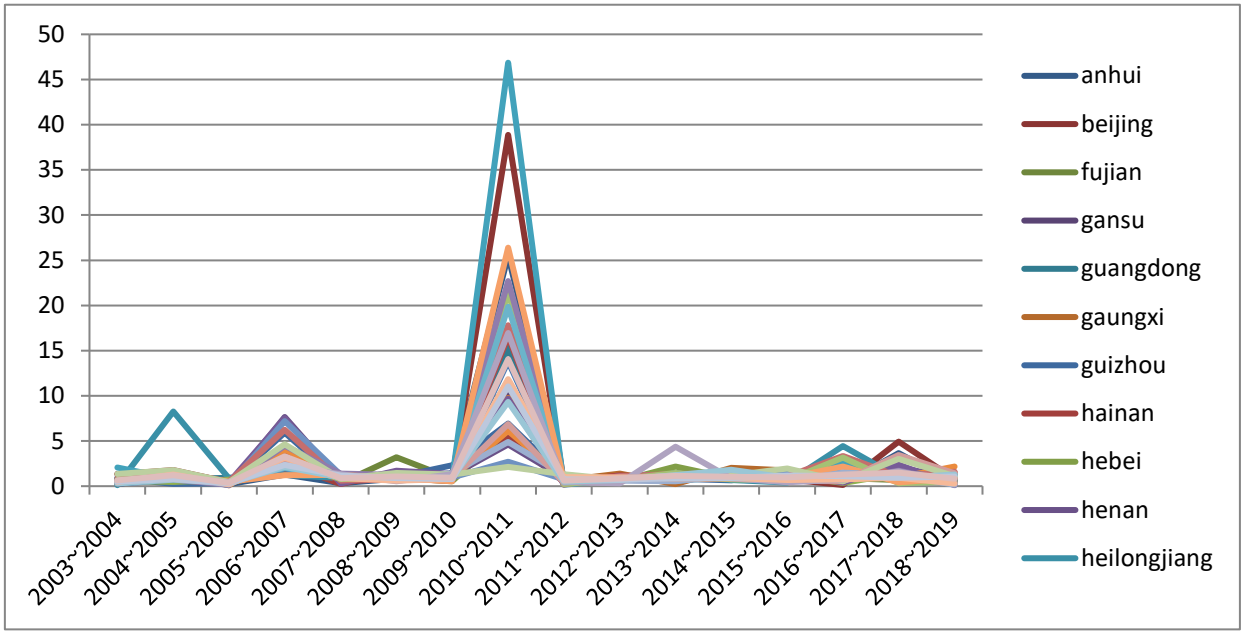

Figure 2.33 – Time effect of eco-efficiency

Hausman test result: p-value=0.2253, less than 0.5, suggesting that the null hypothesis is rejected, and fixed effects are selected. Fixed effects model effects, fixed effects, and random effects are simultaneously used for regression. In the regression equation, the intercept term is only related to the individual, indicating that the difference between provinces does not change over time. The model assumption is:

$$DEA_{it} = \alpha + \beta_1 GDP_{it} + \beta_2 WR_{it} + \beta_3 CY_{it} + \beta_4 KJ_{it} + \beta_5 CZ_{it} + \varepsilon_{it}$$

Formula 2-13

The regression results are presented in Table 2.15.

The results of the model suggest that there is no positive correlation but a negative correlation between GDP and tourism eco-efficiency in 17 years. For every 1,000 yuan increase in per capita GDP, the eco-efficiency of tourism decreases by 0.35%, further revealing that the level of regional economic development is boosted, and the eco-efficiency of tourism is reduced. The investment in environmental pollution control has not brought objective benefits. If the industrial structure (CY) rises by 1%, the eco-efficiency of tourism increases by 0.123%. There is a certain positive correlation between research and experimental development funding (KJ) and tourism eco-efficiency. The input of the tertiary industry output value (CZ)

represents the regional tourism service level. Specifically, the more the investment, the lower the eco-efficiency of regional tourism.

Table 2.15 – Fixed effects and random effects regression

	(1)	(2)
VARIABLES	fe	re
GDP	-0.00035	-0.00013
	(-1.50)	(-1.22)
WR	-0.15531***	-0.09563**
	(-2.60)	(-2.21)
CY	0.00123*	0.00044
	(1.86)	(1.53)
KJ	0.01461	0.01474
	(0.75)	(1.46)
CZ	-0.00046**	-0.00015*
	(-2.52)	(-1.77)
RD	-0.00000	-0.00000
	(-1.31)	(-1.52)
Constant	2.49291**	2.18424***
	(2.53)	(3.43)
Observations	496	496
R-squared	0.037	
Number of id	31	31

The model's goodness of fit R^2 is 0.037, reflecting that the above five factors have not significant impacts on China's tourism eco-efficiency.

The regression equation can be written as:

$$\mathrm{DEA_{it}} = 2.49291 - 0.00035\mathrm{GDP_{it}} - 0.15531\mathrm{WR_{it}} + 0.00123\mathrm{CY_{it}} + 0.01461\mathrm{KJ_{it}} - 0.00046\mathrm{CZ_{it}} + \varepsilon_{it}$$

In this study, the tourism eco-efficiency of 31 provinces in China is measured using the DEA-Manquist model based on the cross-sectional data of various provinces from 2003 to 2019. The spatial and temporal distribution is presented. Afterward, a panel data model for 2003-2019 is established. Then, the impact of these factors (per capita gross domestic product (GDP); environmental pollution control investment (WR); industrial structure (CY); research and experimental development funding (KJ); tertiary industry output value (CZ) representing the level

of regional tourism services) on efficiency and the relationship between variables are analyzed. Thus, with the purpose of improving the eco-efficiency of China's tourism, the industrial structure should be optimized; the tertiary industry should be vigorously developed; investment in research and experimentation should be performed based on its location advantages and good infrastructure to develop tourism products with high output value and low pollution; besides, emerging industries such as information economy, environmental protection, and health are emphasized based on universities and research institutes from the aspects of transportation and hotels. Low-efficiency areas should pay attention to ecological construction while vigorously developing tourism based on local characteristics, natural and cultural features. To sum up, different provinces and regions should establish regional cooperation with the goal of sustainable tourism development and communicate in terms of tourism development experience and ecological environmental protection, so as to jointly improve tourism eco-efficiency.

This part firstly sorts out the current situation of tourism development in China and Ukraine, and then analyzes the role of tourism in promoting China's economy by empirical research. Third, the comparative analysis of tourism competitiveness between China and Ukraine is demonstrated through data. Summarize the problems of tourism in two countries and put forward the corresponding countermeasures. Souvenirs in Chinese scenic spots have a single style and lack Chinese characteristics, while the quality of Ukraine's service industry cannot keep up with the rapid development of Ukraine's tourism industry and cannot fully meet the needs of tourists. Therefore, the two countries need to improve their tourism competitiveness in the context of Belt and Road cooperation. From the optimization of tourism structure, rational planning of tourism resources, optimization of tourism layout, active market main body, strengthen management, realize standardized management, provide perfect information services and so on.

Dedicated to the peculiarities of the development of tourism management in China, it outlines the key aspects that determine the dynamics and features of the tourism industry in this country. Observations of the Chinese experience of tourism

management indicate the decisive role of cultural heritage in attracting tourists. China successfully combines modernity and tradition, creating a unique tourist product. When considering large infrastructure projects, great attention can be paid to the development and support of tourist regions. Also, an important factor in Chinese tourism is the active use of technology and innovation. Electronic booking systems, mobile applications, and other technological solutions not only make travel easier for tourists, but also make interaction with the industry more efficient and convenient. An important aspect is also the high degree of government support for the development of tourism. The Chinese authorities actively encourage investment in tourism projects and use marketing strategies to increase their international appeal. The conclusions of this paragraph emphasize that China's successful tourism management model is based on a combination of cultural values, technological innovation, and effective government support. Considering these features can serve as an important source of insights for other countries looking to optimize their tourism sector.

Analyzing the state of the industry, it is necessary to recognize the extraordinary potential of Ukraine due to its diverse cultural heritage, historical monuments and natural beauties. The post-war recovery was a period of active reconstruction and revival of tourist destinations, which today play an important role in the country's tourist attractiveness. On the other hand, infrastructure and marketing challenges require attention and effective strategies. Compared to other countries, Ukraine may face certain restrictions in the development of tourism, and therefore the development of innovative approaches to advertising and infrastructure development is critical. In the context of post-war recovery, it is important to emphasize the imperative of sustainable tourism development, which takes into account the preservation of cultural values and natural resources. By engaging with local communities and stimulating their participation in tourism processes, it is possible to ensure mutually beneficial development for all parties. The overall conclusion is that Ukraine has the potential to become a significant player in the global tourism industry, and success will lie in solving complex challenges and using

its unique strengths to attract the attention and visits of tourists.

The analysis of ecological tourism and the prospects for its development revealed that this segment of the industry represents a significant potential for sustainable development and conservation of natural resources. The high demand for eco-friendly travel indicates the growing interest of the global audience in environmentally appropriate forms of recreation. The peculiarity of eco-tourism in its interaction with natural environments and communities creates the basis for the development of responsible tourism. Strategies aimed at biodiversity conservation, environmental education and local participation can contribute to solving sustainability problems in the field of eco-tourism. The proactive use of technology to raise awareness and accessibility of eco-friendly routes is key to attracting new tourists. Given these aspects, the prospects for the development of eco-tourism largely depend on a balanced approach, where tourism contributes to the preservation of the environment and the development of local communities, while providing pleasure for travelers and responding to environmental challenges.

Conclusions to section 2:

This section outlines the current situation of China's tourism industry, analyzes its competitiveness by comparing with other countries, and applies the Diamond Model theory of Michael Porter to identify factors affecting China's tourism's development.

1.The article begins by highlighting the current situation of China's tourism industry since its establishment in 1949. Since 2010, the growth rate of China's tourism imports has exceeded that of exports, leading to a shift from a trade surplus to a trade deficit.

2.Combs the number of inbound tourists in China, which has grown from 11.23 million in 2001 to 31.88 million in 2019, a growth rate of 283.8%. However, the annual growth rate has been slow, and the industry has experienced a significant decline due to the COVID-19 pandemic. Looking at the source of inbound tourists,

the focus is on Asia, while the European market is sluggish. Looking at the inbound tourism destinations, there are more tourists to the eastern region than to the western region, indicating a development trend of strong development in the east and weak development in the west of the China's tourism industry. Looking at the income and composition of inbound tourism, the proportion of ticket and transportation income is too high, and there are few souvenir and related tourist consumption products, resulting in low added value. As for outbound tourists, with the improvement of the Chinese people's standard of living and the increase in studying abroad and business, the number of outbound tourists continues to rise.

3. With the development of information technology, China has launched the development of "smart tourism". The application of e-commerce in the tourism industry has rapidly developed, which has prompted changes in the tourism industry. Scenic spots, hotels, and transportation industries actively use artificial intelligence, virtual reality, and other technologies to promote the development of China's tourism industry.

4. Discusses the evaluation system of China's tourism industry competitiveness and measures it through corresponding indicators. In the tourism industry, relevant indicators are often used to measure international competitiveness. This study selects the international market share (IMS), the trade competitiveness index (TC), the revealed comparative advantage index (RCA), and the Vollrath's revealed comparative advantage index (VRCA) to analyze the competitiveness index of China, the United States, Japan, Thailand, Spain, Germany, and Ukraine in the tourism industry. The tourism competitiveness index of China and Ukraine is similar, but there is still a large gap compared to developed countries, which is consistent with the world ranking.

5.Based on the analysis of competitiveness indicators, it is concluded that China is a "tourism power of quantity " rather than "of quality". And the factors influencing China's tourism competitiveness are analyzed.

6.Uses Michael Porter's Diamond Model theory to analyze the factors affecting China's tourism competitiveness, including production factors, demand factors,

related and supporting industries, corporate structure and competition, government and opportunities.

7. Based on “diamond theory”, production factors, demand factors, and corporate structure and competition affecting a country's tourism competitiveness. It also highlights the crucial role of related and supporting industries. The application of e-commerce in the tourism industry is also emphasized.

3 DEVELOPMENT AND MANAGEMENT OF INNOVATIVE METHODS FOR THE ORGANIZATION AND ECONOMIC BASE OF TOURISM

3.1 Empirical analysis of the evaluation of the competitiveness of China's tourism industry

This section focuses on empirical analysis. Based on the "Diamond Model," relevant variables are selected to construct a multiple regression model for regression analysis of China's competitiveness of tourism industry.

The principle of typicality is used to select indicators that reflect the characteristics of China's tourism industry and can truly reflect the reality [167-169].

The principle of quantification is used to ensure that the indicators are measurable, the data is of the same magnitude, and can be quantitatively processed to perform mathematical calculations and analysis [170, 171].

The principle of systematicness is used to select indicators that conform to the characteristics of the tourism industry, with independent and logical relationships between each other, which can reflect their degree of influence on the tourism industry [172, 173].

Data selection

Over the years, many scholars have conducted empirical analyses of factors influencing the competitiveness of the tourism industry, with the Porter Diamond Model as a theoretical basis. This paper's quantitative analysis of influencing factors will be based on Porter's Diamond Model (discussed in section 2.3). When selecting indicators for empirical analysis, in addition to following the principles of typicality, systematicity, and quantifiability, recent developments are considered. Scholars researching the competitiveness of the tourism industry have mostly considered the exports and used tourism foreign exchange earnings as the dependent variable. However, this study believes that exports cannot fully measure the international competitiveness of the tourism industry. Using the indicator evaluation system of

international competitiveness established earlier, the Trade Competitive Advantage Index comprehensively considers imports and exports and takes into account negative values in TC, IMS, and VRCA. Therefore, the RCA index are selected as the dependent variable, representing the level of China's international competitiveness of tourism industry [174-177].

Regarding the selection of independent variables, this study considers the following factors. First, as for the production factors, the number of scenic spots and the number of tourism majors are selected. The Porter's Diamond Model suggests that human capital is an important factor affecting industry competitiveness. The high-level talents will also influence the improvement of international competitiveness of tourism. Second, at the demand factor level, the increase in domestic tourism demand will make related companies improve their operating methods and provide better services, which will have a significant impact on improving tourism competitiveness. Domestic tourism consumption reflects residents' willingness to travel and their expenses on travel, and domestic tourism consumption volume is selected representing domestic tourism demand[178]. The selected factors at the related industry level include the number of international flights and the application of e-commerce technology. Transportation is the primary consideration for residents' tourism travel. As mentioned in the earlier analysis of China's tourism industry, transportation accounts for a large proportion of revenue. Domestic high-speed railways and international flights are important ways to connect foreign tourists with China. Therefore, we select these factors as independent variables[179, 180].

The tourism industry is an information-intensive and information-dependent industry, as well as an industry with cross-border and cross-space operation. The tourism industry relies less on logistics, and tourism service activities have characteristics such as cross-industry (heterogeneity), cross-region (spatial dispersion), time continuity and spatial dispersion (networking), imagination promotion (intangibility), and dynamic instability (real-time). All of these make the tourism industry naturally adaptable to e-commerce. The combination of e-

commerce's information advantage, cost advantage, efficiency advantage, and the characteristics of the tourism industry will comprehensively improve the competitiveness of the tourism industry[166]. The combination of e-commerce and the tourism industry is reflected in following aspects:

(1) Adapt to changes in consumer demands and improve the quality of tourism services. In the era of the internet, there have been significant changes in consumer demands in the tourism industry. People's reliance on the internet, changes in way of acquiring information, and the need for personalized tourism services have forced the tourism industry to change traditional service. By utilizing the information advantages of e-commerce and keeping up with market demand changes, the tourism industry can improve the quality and level of its services, thereby gaining a competitive advantage. Specifically, e-commerce has enhanced the ability of tourism companies to communicate and process information, enabling the development of all-round high-quality services that focus on pre-sales communication, personalized services, and maintaining customer relationships. Tourism companies can provide travelers with travel information and professional consulting at decision-making stage through the internet. Travelers can then actively search and read to obtain information, which is at low-cost. Tourism companies can also provide convenient purchase methods and timely interactive communication to travelers. E-commerce provides convenience and technical support for collecting visitor opinions and suggestions, establishing emotional and humanized relationships with visitors, and providing personalized services and innovative tourism products based on understanding visitor needs.

(2) Promoting organizational changes in tourism enterprises. E-commerce reduces the internal organizational costs and transaction costs of tourism enterprises. The reduction of internal organizational costs provides the possibility for tourism enterprises to improve their economies of scale and develop towards groupization. E-commerce enables large tourism enterprises to establish highly developed networked booking and marketing systems, which form efficient management for the flow of people, goods, funds, and information. By realizing internal information

sharing through enterprise intranets, management capabilities are strengthened, management efficiency is improved, and management costs are reduced, thus enhancing the competitiveness of the enterprise. The reduction of market transaction costs is conducive to the external alliance and networked cooperation of tourism enterprises. Independent tourism enterprises with different property rights establish a virtual consortium through "enterprise network", and realize networked collaborative operations with complementary products, division of labor, and customer source sharing through each tourism enterprise's advantages, jointly expanding influence and opening up markets.

(3) Promoting the optimization of the tourism industry. E-commerce promotes the rationalization of the tourism industry structure. Tourism enterprises in the e-commerce environment can make different choices for their development strategies based on their own different conditions: large tourism enterprise groupization, medium-sized tourism enterprise specialization, and small tourism enterprise networking, thus forming a reasonable tourism industry organizational structure that is moderately sized, competitively ordered, and complementary in advantages, which promotes coordinated operation among enterprises in the tourism industry. The competitiveness of the tourism industry is a set of competitiveness formed by the synergy and cooperation of various aspects of the tourism industry. E-commerce provides the tourism industry with excellent means of information communication, business cooperation networks, and joint promotion platforms, enhancing the correlation and coordination among various subsystems and institutions of the tourism industry, thereby enhancing the collective competitiveness of the tourism industry.

(4) Provide a good way for government-led destination marketing. The internet provides an excellent medium for promotion, with its vibrant colors, dynamic effects from multimedia technology, real-time updates, interactive functions for retrieval and search, and low cost. Establishing an authoritative information website for a tourism destination that provides the most comprehensive, accurate, and timely travel information to the public is an effective way to promote

and sell to remote markets and to increase the competitiveness of the destination.

As a complex interactive system that includes active marketing, tourism reservations and transactions, market feedback, etc., the Destination Marketing System (DMS) is a new promotional channel for tourism destinations. The DMS is developed and constructed by professional e-commerce service providers, with investment from the tourism destination government, and participation from local tourism companies for a fee. The DMS serves as a window for shaping and promoting the tourism destination's image, a platform for international B2B and B2C e-commerce, and a convenient information and business service provider for travelers before, during, and after their trips.

To achieve the successful leap from a tourism power of quantity to that of quality, China must enhance its comprehensive competitiveness in tourism with advanced marketing techniques, scientific management methods, and innovative development concepts. E-commerce, as a new business activity, not only has an important impact on tourism competitiveness, but also changes the way tourism services are provided and improves its level and quality. It promotes the healthy and rapid development of the tourism industry by pushing it towards more rational structure and higher operational levels.

The application of computer network technology supports the development of the tourism industry through the number of tourism apps and websites (data source: CNNIC). Therefore, the number of online travel booking users represents the scale of e-commerce applications in tourism. The number of travel agencies and star-rated hotels are chosen as indicators of enterprise strategy, structure, and competitor. A company needs a certain amount of investment to grow and develop, so the ability to obtain funding is an important aspect of measuring a company's success. Travel agencies and star-rated hotels are the most basic units for meeting the needs of tourists and play an important role in promoting the development of the tourism industry. The number of domestic travel agencies and star-rated hotels also represents the competition in the tourism market, so the number of travel agencies is chosen as an explanatory variable [181-183]. Since factors of government and

opportunity are difficult to quantify and opportunity has uncertainty, they are not included as explanatory variables in this analysis. The variable system established based on this is shown in Table 3.1.

Table 3.1 - Variable Selection

Type	Variables	Symbols
Dependent variable	RCA Index of Tourism Competitiveness	y
Independent variables	Number of scenic spots	X1
	Number of tourism majors	X2
	Number of travel agencies	X3
	Domestic tourism consumption	X4
	The amount of financing for tourism enterprises	X5
	Rail and flight mileage	X6
	Number of star-rated hotels	X7
	E-commerce apps	X8

Source: author´s development

（2）Descriptive analysis and data processing

Firstly, descriptive statistical analysis is performed on the dependent variable, independent variable, and control variables, as well as the characteristics of the tourism competitiveness index RCA, the number of scenic spots, the number of tourism majors, the number of travel agencies, domestic tourism consumption, tourism enterprise financing amount, railway and flight mileage, the number of star-rated hotels, and the application of e-commerce. Analysis of the mean, maximum value, minimum value, standard deviation, and other measurement indicators of each factor helps to understand the overall characteristics and internal rules, such as the overall level of development, concentration trend, dispersion, and degree of development differences. Through descriptive statistics of variables, it is also more convenient to select more suitable statistical research and analysis methods. The descriptive statistical analysis of the dependent variable, independent variable is shown in Table 3.2.

Table 3.2 Descriptive statistical analysis

Vairiable	Obs	Mean	Std.Dev.	Min	Max
y	15	0.9425	0.2595	0.51	1.41
X1	15	724936.2	233124.8	11807	2080897
X2	15	2686391.8	441196.7	2044001	3283625
X3	15	30351.9	6216.34	23690	40652
X4	15	34866.08	13126.13	19305.4	57250.89
X5	15	496.42	414.47	16.32	1197.82
X6	15	6195064.3	2382216.1	3280114	9482204
X7	15	11489.3	1709.94	8962	13513
X8	15	134.24	78.56	78	156

Source: author′ s development

Based on the descriptive statistical analysis of the dependent and independent variables mentioned above, there is a large difference in the units of each variable and their dimensionalities are inconsistent. To eliminate the impact of dimensional inconsistency on the results, the dependent and explanatory variables are standardized. The formula for standardization is shown in 3-1:

$$X' = \frac{X - X_{min}}{X_{max} - X_{min}} \qquad \text{Formula 3-1}$$

X' represents the values of each variable after standardization, X represents the original values of each variable, and X_{min} represents the minimum and maximum values respectively.

(3) Correlation Analysis

Correlation analysis is an important method for measuring the degree of correlation between two variables over time. It is also a prerequisite for model estimation of dependent and independent variables. If the correlation shows that there is no relationship between the dependent and the independent variables, it indicates that the selected indicators are problematic or that the independent variables are not appropriate and need to be removed. Also, correlation analysis can also examine the correlation between independent variables, so as to judge whether

there is multicollinearity, which is also an important basis for judging the rationality of independent variables. Therefore, in order to observe whether there is a significant correlation between the dependent variables and independent variables and the degree of correlation, the correlation coefficient and significance level between each variable were calculated using Stata 15, as shown in Table 3.3 "V" represents the variable name.

The results of the correlation analysis show that only X_6 and X_7 have a low correlation with the dependent variable, and failed to pass the significance level test. The other six selected independent variables have a significant correlation with the dependent variable: tourism international competitiveness, at the 1% significance level and show varying degrees of correlation. It can be inferred that the selected indicators are reasonable and standardized. However, the table also shows that there is a certain degree of correlation between the independent variables. Therefore, to construct a reasonable and accurate regression model, it is necessary to conduct tests for multicollinearity and heteroscedasticity in subsequent analyses.

Table 3.3 - Correlation analysis

V	1	2	3	4	5	6	7	8	9
y	1.000								
X1	0.703（0.065）	1.000							
X2	0.596（0.069）	0.859（0.002）	1.000						
X3	0.328（0.355）	0.793（0.001）	0.643（0.014）	1.000					
X4	0.797（0.000）	0.594（0.026）	0.592（0.148）	0.623（0.121）	1.000				
X5	0.867（0.002）	0.803（0.005）	0.674（0.044）	0.615（0.058）	0.825（0.000）	1.000			
X6	0.344（0.104）	0.585（0.000）	0.809（0.000）	0.811（0.000）	0.504（0.065）	0.350（0.012）	1.000		
X7	-0.553	-0.896	-0.677	-0.850	-0.694	-0.751	-0.866	1.000	

	（0.097）	（0.000）	（0.032）	（0.002）	（0.026）	（0.012）	（0.001）		
X8	0.820（0.123）	0.968（0.000）	0.813（0.005）	0.949（0.000）	0.663（0.037）	0.773（0.009）	0.969（0.000）	0.920（0.000）	1.000

Source: author′s development

(5) Model construction and regression analysis

According to the results of the correlation analysis, the correlation between the independent variables and the dependent variables is high, so regression analysis can be done, and the model established is shown in Formula 3-2:

$$y_i = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + \varepsilon i$$ Formula 3-2

Where b_0 represents the intercept term, b_i represents the coefficient of each variable, ε_i represents the random error term. The results of regression analysis of the model using Stata 15 are shown in Table 3.4.

Table 3.4 - Regression analysis

y	Coef.	St.Err.	t-value	P-value	[95%Conf	Interval]
X1	-1.764	2.008	-0.93	.534	-26.363	23.645
X2	.271	.737	0.38	.795	-8.091	9.633
X3	-.678	.553	-1.41	.391	-7.805	6.15
X4	1.697	.722	2.15	.256	-7.476	10.803
X5	-.33	.634	-0.25	.595	-8.388	7.729
X6	2.915	3.433	0.75	.573	-39.72	47.43
X7	-.871	1	-0.77	.592	-13.474	11.932
X8	-.296	.33	-0.91	.635	-4.448	3.196
Constant	.302	.354	0.85	.55	-4.193	4.777
Mean dependent var		0.530	SD dependent var			0.462
R-squared		0.971	Number of obs			15.000
F-test		12.368	Prob>F			0.238
Akaike crit.		-17.857	Bayesian crit.			-15.434

（AIC）			（BIC）			

***p<0.1,**p<0.5,*p<1

Source: author′s development

Based on the adjusted R^2 value of 97.1%, it can be concluded that the independent variables can effectively explain the dependent variables. However, it can be observed from the p-values and significance levels of the coefficients of the independent variables that none of the variables are significant. This result is in stark contrast to the correlation analysis results and expectations. Therefore, it suggests that the model is not reasonable and needs to be tested and adjusted.

(6) Model Testing and Adjustment

Multicollinearity Test

The tolerance value ranges from 0 to 1. When the tolerance value is small, it indicates that there is multicollinearity between this independent variable and other independent variables. If the estimation of the regression coefficient of the tolerance variable is not stable, the calculated value of the regression coefficient will also have an error. The variance inflation factor (VIF) is the reciprocal of the tolerance value. The larger the VIF, the smaller the tolerance of the independent variable and the more collinearity issues.

Usually, 10 is used as the boundary. When VIF<10, there is no multicollinearity; when 10<=VIF<100, there is a strong multicollinearity; when VIF>=100, there is severe multicollinearity.

In this study, due to the large discrepancy between the results of the regression model analysis and the correlation analysis, and the significant correlation between the independent variables in the correlation analysis, a multicollinearity test was conducted on the model. The presence of multicollinearity is primarily determined by the variance inflation factor (VIF), where a higher VIF indicates more severe multicollinearity and a lower VIF indicates less severe multicollinearity. If the VIF value for multicollinearity is greater than 10, then there is multicollinearity, and if the VIF value is greater than 100, then there is severe multicollinearity

According to the results of the multicollinearity test mentioned above, it is

evident that there is a severe multicollinearity in the model. The variable X6 has the highest VIF of 747.08, and the VIF value for X7 is 281.33, which is much higher than the critical value of 100. The VIF values for other variables are also relatively high, indicating a severe multicollinearity in the model.

An important assumption in linear regression models is that the error term in the regression function is homoscedastic. However, if the error term has different variances, the least-squares estimation will be biased from the true values. Therefore, it is necessary to conduct a heteroscedasticity test on the model.

There are various methods for conducting a heteroscedasticity test, including graphical methods and the White test. This study selects the White test to examine whether the model exhibits heteroscedasticity. In the White test, the null hypothesis is that the error term in the regression equation is homoscedastic.

The alternative hypothesis is that the error term exhibits heteroscedasticity

The rule of judgment is that if prop>chi2(k), the null hypothesis will be rejected, indicating that the regression equation exhibits heteroscedasticity. In the above formula, n represents the sample size, and the degrees of freedom are k (the number of explanatory variables).

Table 3.5 - Multicollinearity Test

Variable	Variance Inflation Factor	1/Variance Inflation Factor
X6	747.08	0.001346
X7	281.33	0.003767
X1	41.78	0.012328
X2	38.34	0.027210
X3	35.04	0.025017
X4	34.36	0.027902
X5	26.35	0.036429
X3	21.78	0.043873
X8	8.62	0.11533

Source: author´s development

White’s test for HO： homoskedasticity

Against Ha：unrestricted heteroskedasticity

Chin2(9)=10.00

Prob> Chin2=0.4525

Cameron&Trivedi's decomposition of IM-test

Based on the above heteroscedasticity test, the p-value is 0.4525, which is greater than the significance level of 5%. Therefore, the null hypothesis cannot be rejected, indicating that the regression model satisfies homoscedasticity, and using the least squares method for regression analysis is reasonable.

According to the above multicollinearity and heteroscedasticity tests, it can be concluded that there is severe multicollinearity in the model, with the highest VIF for the number of scenic spots (X_1), railway and air mileage (X_6), and the number of star-rated hotels (X_7). Therefore, these three variables were removed and the remaining indicators were re-analyzed using regression analysis to establish an adjusted model, as shown in Formula 3-3:

$$y_i = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_8x_8 + \varepsilon i \qquad \text{Formula 3-3}$$

The results of regression using Stata 15 are shown in Table 3.6.

Table 3.6 - Regression analysis

y	Coef.	St.Err.	t-value	P-value	[95%Conf	Interval]
X1	.717	.193	3.65	.007	.291	1.705
X2	.738	.153	4.81	.009	.311	1.159
X3	-.797	.189	-4.06	.014	-1.312	-.261
X4	1.219	.264	4.55	.010	.452	1.904
X5	-.109	.397	-0.37	.033	-.834	.719
X8	1.023	.193	-0.78	0.021	-.609	.345
Constant	0.401	.190	0.36	0.55	-.301	.267
Mean dependent var		0.530	SD dependent var			0.442
R-squared		0.979	Number of obs			15.000
F-test		39.121	Prob>F			0.002
Akaike		-15.813	Bayesian			-13.797

crit. （AIC）			crit. （BIC）			

****p<0.1,**p<0.5,*p<1*

Source: author´s development

After adjustment, the regression equation is:

$$Y = 0.401 + 0.527x_1 + 0.738x_2 - 0.797x_3 + 1.219x_4 - 0.109x_5 + 1.023x_8 + \varepsilon i$$

Empirical analysis results show that the regression coefficients between the independent variables (number of tourist attractions (X_1), number of tourism majors (X_2), number of travel agencies(X_3), domestic tourism consumption (X_4) and the dependent variables have passed the significance level test. The regression coefficients for the number of tourist attractions (X_1), and the number of tourism majors (X_2) are 0.527 and 0.738, with standard deviations of 0.193 and 0.153, and p-values of 0.007 and 0.009, respectively, which are both less than the significance level of 0.01. Therefore, it can be concluded that the number of tourist attractions and the number of tourism majors have a significant impact on tourism competitiveness, and based on the regression coefficients, it can be seen that they have a positive impact on China's international competitiveness of tourism. Whenever there is an increase in one unit of tourism practitioners, China's international competitiveness of tourism increases by 0.527 and 0.738, respectively. As the number of tourist attractions and the number of tourism majors are indicators that measure production factors, it can be explained that production factors have a strong impact on China's international competitiveness of tourism. The regression coefficient for the number of travel agencies (X_3) is -0.797, with a p-value of 0.014, which has passed the significance level test of 5%. This indicates that the strategic structure and competition of enterprises have a significant impact on China's international competitiveness of tourism. Since the coefficient value is negative, it suggests that travel agencies have a negative and significant impact on China's international tourism RCA. This may be due to the fact that in recent years, many small travel agencies have emerged in China's rapidly developing tourism industry, but these new travel agencies may not be professional. Relevant studies have also

found that the overall operating efficiency of China's travel agencies is low[184], and it shows characteristics of management chaos and being weak and poor[185]. This may have led to the decline in China's international competitiveness of tourism as the growth of travel agencies has increased. The regression coefficient for domestic tourism consumption (X_4) is 1.209, which has a significant impact on international competitiveness of tourism. Domestic tourism consumption reflects the demand for tourism in a country. An increase in demand will lead to more consumption. As "picky" consumers increase, their demand for high-quality tourism services will increase, forcing Chinese tourism companies to improve their management skills and level and launch more high-quality tourism services. This will make China's tourism industry more diverse and characteristic, thus enhancing its competitiveness. Therefore, production factors, enterprise strategic structure and competition, and demand factors all have a significant impact on China's international competitiveness of tourism.

The amount of financing (X_5) for tourism companies is an indicator that measure supporting industries. Its regression coefficient is -0.109, the standard deviation is 0.397, the t-value is -0.37, and the p-value is 0.033, which is less than the significance level of 0.05. Therefore, it has passed the 5% significance level test, indicating that tourism companies, especially small and medium-sized ones, have difficulty in financing, with low financing repayment rates, and some cannot repay in a timely manner, resulting in bankruptcy. According to the regression coefficient, financing for tourism companies has a negative impact on the international competitiveness of China's tourism industry because of the negative coefficient. This further shows that the financial industry does not promote tourism competitiveness but causes a decline in the competitiveness of tourism companies. The main reason is that the government does not pay enough attention to the financing of tourism companies, especially small and medium-sized ones, and the financing of companies causes bad debts, tourism companies run away, and then go bankrupt.

The regression coefficient for the application of e-commerce (X_8) is 1.023. In the current era of digital economy, the social labor productivity has been greatly

improved, promoting the development of social productive forces. Information technology, digital technology, and the production, circulation, and consumption of modern enterprises are closely related, not only improving the production efficiency of enterprises but also innovating the industrial structure. The combination of 5G, big data, APPs, and the tourism industry is becoming increasingly close, providing support for the future recovery of the tourism industry. During the epidemic, thanks to excellent epidemic prevention policies, China's OTA companies, led by Meituan and Ctrip, performed well and greatly promoted the development of the tourism industry in terms of net profit[184]. Therefore, as an e-commerce companies, they have played a positive role in supporting the expansion of China's international competitiveness in the tourism industry.

3.2 Agorithm framework for improving the competitiveness of China's tourism industry

Model analysis based on the "PEST" (see Table 1.1)

In terms of tourism competitiveness, the "PEST" model includes four major external environmental factors: political, social, economic, and technological, as shown in Figure 3.1.

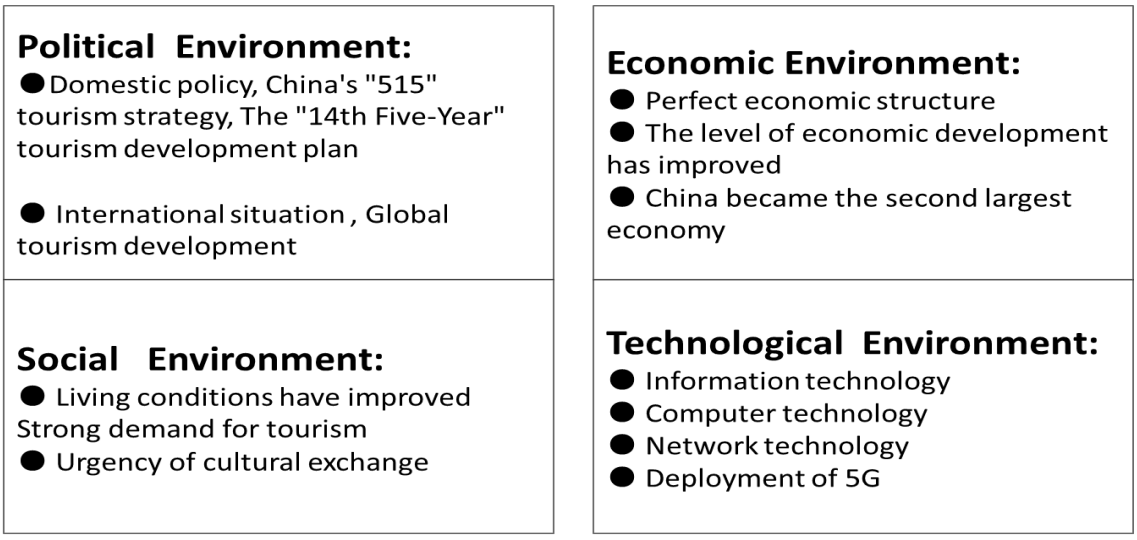

Figure3.1 - PEST Model (Source: author's development)

(1) Political Environment Analysis (P): Tourism Laws and Policies

Through analysis of the political and legal environment, new business opportunities can be discovered or potential business risks in the tourism industry can be identified in advance. China's tourism policy has undergone 16 revisions from 2010 to 2020, including the "515 Strategy" and the "13th Five-Year Plan" for tourism development, providing legal protection for the industry's development.

(2) Economic Environment Analysis (E): Analyzing the economic environment provides economic support for the development of the tourism industry, including foreign trade environment, economic development level, economic structure, infrastructure, and factor markets. With the deepening development of China's reform and opening up, China's foreign trade has developed rapidly, and China has become the world's second largest economy. In terms of tourism, China has a 5,000-year civilization and rich historical and cultural resources, with a huge tourism factor market.

(3) Social Environment Analysis (S): In 2022, China's population will reach 1.4 billion, living conditions have improved, and there is a demand for leisure and cultural enrichment. Some people want to travel abroad to study or work and experience new cultures.

(4) Technological Environment Analysis (T): The construction of various tourism platforms, computer technology, and the application of the internet have greatly facilitated the query of tourism routes and introduction of tourism destinations, stimulating the development of the tourism industry.

From a political perspective, there are certain problems with financing for current tourism enterprises, and the government should improve the financing system, encourage the development of non-financial institutions, and promote private financing through loan platforms. While encouraging financing, social services should also be improved. The government should communicate with small and medium-sized enterprises to understand the true needs of tourism enterprises. The government should also reserve special funds, improve credit guarantee associations and credit public libraries, and actively support tourism enterprises with good credit, as shown in Figure 3.2.

From an economic perspective, improving the economic structure and actively promoting the development of the tertiary industry, especially the tourism industry, can enhance the level of economic development and people's living standards. Improving the market economy, private economy, and export-oriented economy provides strong economic support for the development of the tourism industry. According to statistics from the National Tourism Administration, the amount of private capital involved in tourism projects in China has reached 800 million yuan. Since 2015, more than 34 private enterprises have invested in the tourism industry in China, and private capital accounts for 3% of the nearly 100 tourism projects currently under construction.

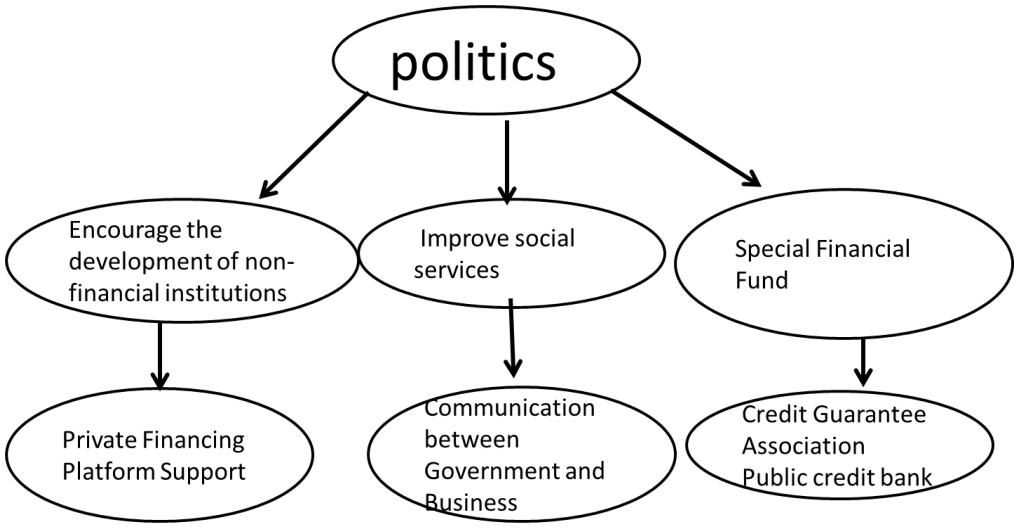

Figure3.2 - Politics

Source: author´s development

Economic perspective

The scale of private enterprise investment in the tourism industry has unprecedentedly expanded, and the investment types have achieved a significant leap from simple sightseeing tourism to comprehensive leisure and holiday tourism, covering almost every aspect of tourism activity. The industrialization, urbanization, marketization, and internationalization of the regional economy not only attract tourists from all over the country, but also attract business travelers from all over the world, greatly promoting the development of the business tourism market. It can be seen that the development of China's tourism industry has a good regional economic

environment, not only achieving considerable tourism economic income but also showing a rapidly increasing trend year by year, as shown in Figure 3.3.

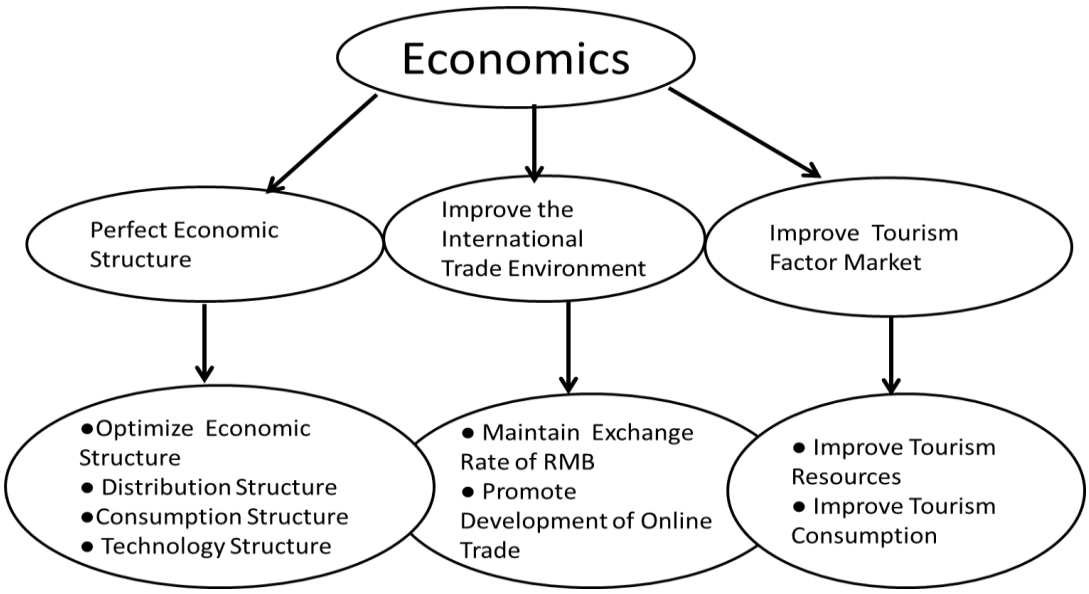

Figure3.3 - Economics

Source: author´ s development

Social perspective

China proposes to focus on tourism not only for the sake of the economy, industry, and economic structural adjustment, but also for culture, spiritual civilization, and sustainable development. Developing tourism means developing the reputation and fame of the country and cities. For a long time, the Chinese government neglected the linkage function of the tourism industry, resulting in an unreasonable educational structure for tourism practitioners. According to surveys conducted after 2010, only 30% of tourism practitioners have a college degree or above, and only 15% have a bachelor's degree or above. Among the senior management personnel of hotels, travel agencies, and scenic spots surveyed, only 2% have a bachelor's degree or above. Encouraging international cultural exchanges has a close relationship with improving the quality and competitiveness of tourism practitioners, and improving the service level of the tourism industry, which can meet the high-level tourism demand from the tourists, as shown in Figure 3.4.

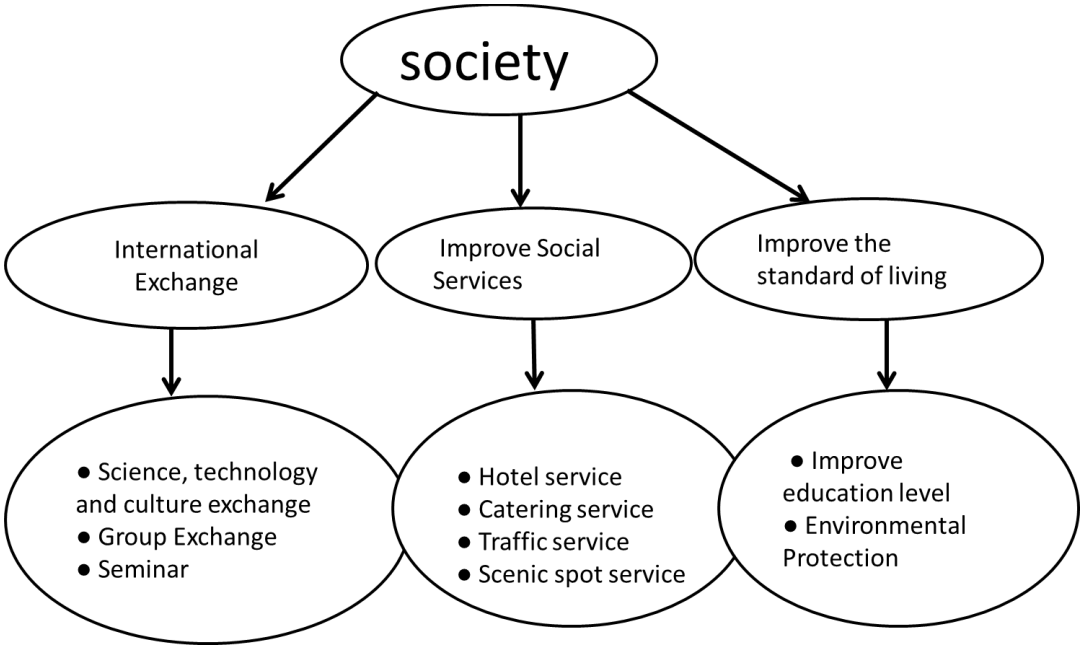

Figure3.4 - Society

Source: author´s development

The application of e-commerce has significantly boosted the international competitiveness of the tourism industry. In the current era of the digital economy, social labor productivity has been greatly improved, promoting the development of social productive forces. Information technology, digital technology, and modern enterprise production, circulation, and consumption are closely related[186].

The combination of 5G, big data, and the tourism industry is becoming increasingly close, providing useful assistance for the future recovery of the tourism industry, as shown in Figure 3.5.

Figure3.5 - Technology

Source: author´s development

First of all, computers are very important in tourism management, mainly reflected in optimizing tourism resource allocation, promoting the internationalization of tourism, promoting sustainable tourism development, and realizing scientific management of information. The tourism industry uses e-commerce technologies such as VR, AI, and AR to achieve smart tourism management and promote smart tourism marketing through internet platforms. In the development of tourism e-commerce, users can use reservation systems (Priceline, Booking.com), room reservation systems (Expedia, Hotels.com), global distribution systems (GDS), online tourism information services (Kayak.com, TripAdvisor), and tourism destination information systems (Travelocit, Orbitz.com) to help tourists complete related tourism business, as shown in Figure 3.6.

Figure3.6 - APP

Source: author´ s development

Constructing the approach to enhance China's tourism competitiveness

Based on the scientific connotation of tourism competitiveness, this study aims to propose relevant suggestions for enhancing China's tourism competitiveness in the process of global tourism development, and analyzes and solves problems at three levels: current analysis, index measurement, and strategic factors. Considering the substantial and structural aspects of the strategic management process, an action plan is formed to enhance competitiveness and development, which provides direction for improving and managing China's tourism competitiveness, as shown in Figure 3.7.

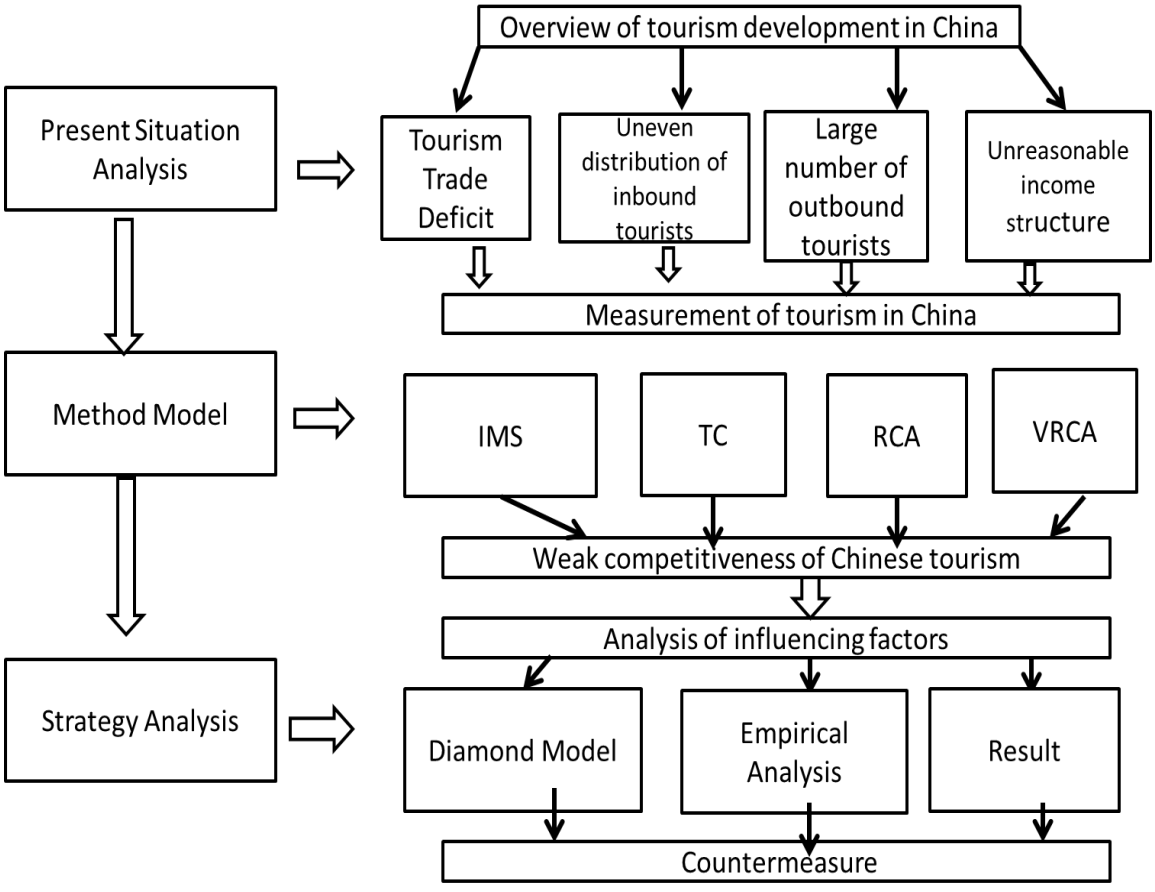

Figure3.7 - Algorithm

Source: author´ s development

According to the plan formulated, the application of the proposed measurement model makes it possible to identify the main factors for improving the competitiveness of tourism trade, and further measure the development level of

China's tourism competitiveness through indicators.

The first part is the current situation analysis, the second part of this study concludes that China's tourism competitiveness is not strong through indicator measurement.

Secondly, in the empirical research section, factors that affect China's weak tourism competitiveness are discussed.

Thirdly, three levels of policies are proposed to enhance China's tourism competitiveness based on different factors.

China’s tourism is an important part of the world tourism service, and its development can not only increase foreign exchange income, create employment opportunities, and optimize industrial structure but also invigorate the world tourism market. Improving China's tourism competitiveness is also an important part of enhancing China's foreign trade, economic growth, and improving its image as a great power. The management and improvement strategy of China's tourism competitiveness is an important activity for China to effectively implement and manage tourism development.

3.3 Countermeasures for improving the competitiveness of China’s tourism industry

Based on the current situation of China's tourism industry and the results of empirical analysis, the researcher believe that improving the competitiveness of the tourism industry is not a problem that can be solved by one aspect alone. It requires three levels of intervention: the national strategic level, the industry level of socio-economic factors, and the tactical level of tourism enterprises [187]. See Figure 3.8 for details.

(1) Effectively develop tourism resources, adhere to sustainable development

China has a land area of about 9.6 million square kilometers and has abundant natural resources, forming various landscapes of mountains, canyons, karst, deserts,

volcanoes, and coastlines, as well as hydrological landscapes such as rivers, waterfalls, lakes, and hot springs. In addition, China is an ancient civilization with a history of 5,000 years and has numerous historical and cultural relics such as tombs and temples. China has 55 ethnic minority groups, and each ethnic group has its own culture and cuisines, forming a unique ethnic cultural tradition. Although tourism resources are abundant, China's development of tourism resources is not yet perfect, and there are significant regional development differences. Due to problems such as slow economic development and inadequate infrastructure in western China, tourism resources have not been utilized to their full potential. The current situation of tourism development does not match the potential of tourism resources, thus requiring the effective development of tourism resources in western China, and adhering to the principles of balanced and green tourism development[188].

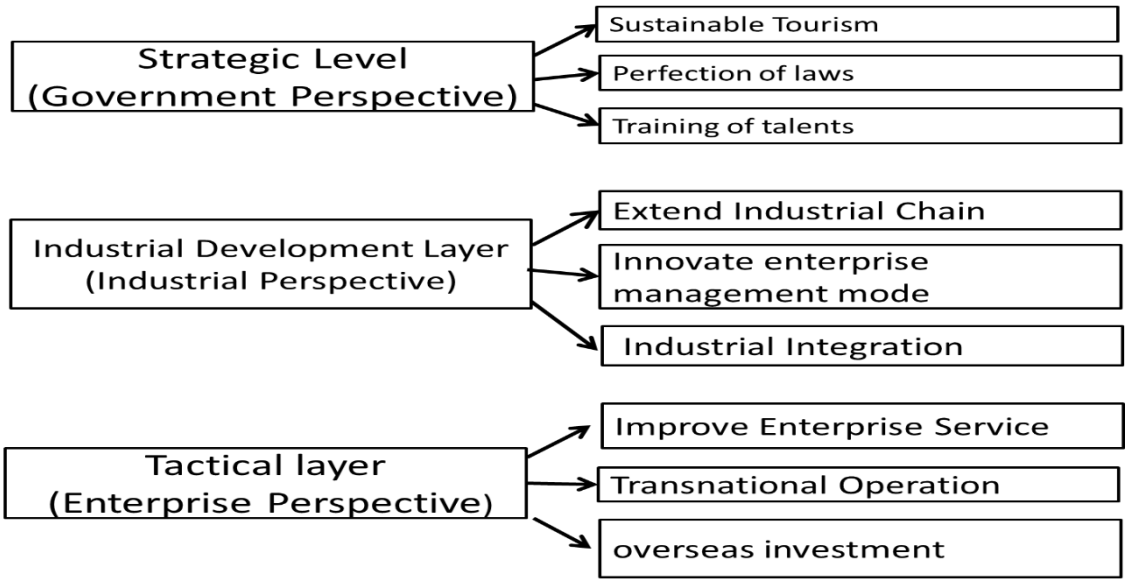

Figure 3.8 - Strategy

Source: author´ s development

(2) Improve relevant laws and regulations and strengthen law enforcement

With the vigorous development of the tertiary industry, tourism has gradually become a new growth point for the national economy, but the relevant laws and regulations are not yet perfect. In recent years, there have been frequent reports of irregular charges in many scenic spots and forced consumption by travel agencies, which has caused dissatisfaction among many tourists. The exposure of issues such

as irregular charges, forced consumption, and poor service attitude indicates that China's tourism-related enterprises are not yet standardized and require the enforcement departments to strengthen regulation. The government should learn from the experience of other tourism powers, combine it with China's actual situation, improve the tourism laws and regulations with Chinese characteristics, and rectify the development environment of the tourism industry.

(3) Enhance the quality of tourism practitioners

From empirical results, tourism practitioners have a positive impact on China's tourism industry's international competitiveness. However, the quality of tourism practitioners is not high, the number of people who hold certificates is less than 80%, and there is also serious problem of non-standard operations. The number of practitioners who master minority languages is also limited, which seriously restricts the development of China's tourism competitiveness. Therefore, it is necessary to actively improve the talent quality from the perspective of talent cultivation.

From an industry perspective

(1)Develop supporting industries and extend the industrial chain

Tourism is a comprehensive industry that relies on several related industries such as transportation, catering, souvenir retail, scenic spot management, and hotel services. Currently, the level of development in these supporting industries in China is relatively low, which limits the potential for enhancing the competitiveness of the tourism industry. Transportation plays a crucial role in the development of tourism services. It is necessary to further strengthen the construction of transportation infrastructure, improve service facilities such as airports, stations, and ports, plan international flight routes, improve pricing mechanisms, and enhance the quality of services provided by staff, in order to provide convenient and efficient services for inbound tourists. Improving the transportation network within the region ensures the accessibility and convenience of transportation between scenic spots.

(2)Innovate the management models of tourism-related enterprises.

To improve the catering and accommodation, it is suggested to learn from advanced experiences and develop a trend focused on mid-to-high-end hotels,

in order to enhance the internationalization of hotel and catering service facilities. As for the souvenir retailing, it is currently common for retail stores near tourist attractions to have homogeneous products with poor quality, which seriously affects tourists experience. Therefore, we need to pay attention to the design and development of tourism souvenir and creative products, improve product quality and design, and design souvenir products with cultural symbols and memorial sense based on local characteristics.

(3) Promote industry integration and comprehensively upgrade tourism

At present, China has not yet achieved the clustering effect between tourism and other industries. In order to achieve the goal of becoming a tourism powerhouse, it is necessary to promote collaboration between tourism and other industries, and form a new situation of integration in the tourism industry. Culture is the soul and bloodline of tourism, and tourism is the platform and carrier for cultural dissemination. Tourism products without cultural connotations cannot have stronger competitiveness. The process of traveling is also a process of discovering and experiencing different cultures. Promoting the integration and development of culture and tourism, and achieving the transition from sightseeing tourism to cultural tourism, the effective integration of the two makes tourism more attractive.

Sports tourism is a new tourism product that has emerged in recent years, which combines sports activities with tourism, helps people develop physically and mentally, and is a manifestation of the highly developed material civilization and spiritual civilization of modern society. Therefore, promoting the integration of tourism and sports is also a major initiative to achieve coordinated development of industries. By actively preparing for various sports events, especially international sports events, foreign tourists can be attracted. Tourism can also be integrated with industries such as industry, agriculture, skiing, and education, to accelerate the upgrading of tourism such as industrial tourism, agricultural tourism, skiing tourism, and study tour tourism. Implementing innovation-driven development can enhance the competitiveness of tourism services.

From a business perspective

(1) Improve service quality and level to provide differentiated services

Tourism-related companies are generally divided into six categories based on tourism activities such as "catering, accommodation, transportation, visiting, entertainment, and shopping", with travel agencies being the most important enterprise in the tourism industry chain. Improving the overall competitiveness of travel agencies is currently the key factor at the enterprise level. Chinese travel agencies should improve their service level and quality according to international standards. They should hire staff with strong language proficiency, employ guides with proficiency in less common languages, and meet the needs of different domestic and foreign tourists. With the improvement of people's living standards, people are increasingly pursuing high-level and personalized spiritual consumption. High-end customized tourism is becoming more and more popular, and companies should launch more personalized products and services to meet the requirements of consumers with different identities.

(2) Explore diversified overseas markets and implement multinational business strategies

As the analysis of the source countries of inbound tourism to China shows, the source countries are too single, mainly concentrated in Asian countries. Therefore, it is necessary to actively explore diversified overseas markets and find more source countries. China should pay attention to the transformation of ideas of international tourism communication in the Internet age. In terms of propaganda, it should pay more attention to internationally renowned social networking sites such as "Facebook" and "Twitter," and use language style that people from various countries can accept to promote tourism concerning cultural differences, and learn to tell the story of Chinese tourism in modern ways and with world languages. Since the proposal of the "Belt and Road" cooperation initiative in 2013, exchanges between China and countries along the route have become increasingly frequent. The tourism industry of countries along the "Belt and Road" has developed rapidly, which has promoted the development of inbound tourism, and is beneficial to the tourism development of western cities in China, improving the imbalance in the development

of the tourism industry.

（3）Enterprises should actively implement the "going global" strategy and seek overseas investment

While strengthening marketing and promotion in Asian countries such as Japan and South Korea, companies should focus on exploring new and potential markets such as Europe, America, and Africa, actively hold exhibition activities, increase marketing investment, strengthen communication and cooperation with overseas enterprises, establish a good corporate image, and use local resources to make the enterprise more deeply rooted in people's minds. Enterprises should innovate their business philosophy, construct a cross-regional and cross-cultural IP image with an internationalization perspective, improve the global supply chain, establish an integrated OTA international tourism platform, actively cooperate with international hotels, scenic spots, airlines, etc. to enhance international competitiveness.

Conclusions to section 3:

This section is an empirical analysis. Based on the previous analysis of the "diamond model," variables were selected from the production factors, including the number of scenic spots and the number of tourism employees, as well as variables from demand factors, including tourism consumption income. Variables from enterprise strategy and organizational structure included the number of star-rated hotels and travel agencies. Variables from the supporting industry included the distance of railway and air travel and the application of e-commerce technology as explanatory variables. The RCA of the tourism competitiveness index was used as the dependent variable. A multiple regression model was constructed using these variables to conduct a regression analysis of the competitiveness of the Chinese tourism industry. The empirical results suggest that there is a positive correlation between tourism practitioners, domestic tourism consumption, and the application of e-commerce technology and the dependent variable. On the other hand, the number of travel agencies and tourism enterprise financing have a negative

correlation with the dependent variable. This indicates that production factors, demand factors, enterprise strategy and structure, and competition, as well as supporting industry, have a significant impact on China's international competitiveness in tourism. Finally, based on the PEST model, strategies for enhancing tourism competitiveness are proposed from perspective of government, industry, and enterprises.

1.Firstly, based on the principle of indicator selection, the development of the tourism industry, and the availability of data, a certain number of variables are selected: the number of scenic spots, number of tourism employees, tourism consumption income, tourism enterprise financing amount, number of star-rated hotels, number of travel agencies, railway and air mileages, and the application of e-commerce technology are selected as explanatory variables, while the RCA of the tourism competitiveness is selected as the dependent variable. Considering the different dimensions of these variables, they are standardized.

2.Correlation analysis is conducted on the standardized results, and the correlation between the eight independent variables and the dependent variable is tested. It is found that the correlation between the railway and air mileages and the number of star-rated hotels is not high. After conducting a multiple linear regression analysis, the adjusted R^2 is 97.1%, indicating that each independent variable can effectively explain the dependent variable. However, based on the P-value and significance of each independent variable coefficient, none of the variable coefficients are significant. The results are vastly different from the correlation analysis results and expectations. Therefore, it is concluded that the established model is not reasonable and requires further testing and adjustment.

3. According to the test results of multicollinearity and heteroscedasticity, there is severe multicollinearity in the model. The VIF of the railway and air mileages(x_6) and the number of star-rated hotels(x_7) is the largest, so these two variables are removed. A regression analysis is then conducted on the remaining indicators to establish an adjusted model.

4. Based on the adjusted regression results of the model, it can be known that

the regression coefficients between the number of tourist attractions(x_1), the number of tourism majors(x_2), and the number of travel agencies(x_3) and the dependent variable have passed the significance level test. The number of tourist attractions(x_1) and the number of tourism majors(x_2) have a significant positive impact on tourism competitiveness. From the regression coefficient of the number of travel agencies(x_3), it can be seen that the enterprise strategic structure and competition have a significant impact on China's tourism industry's international competitiveness. However, in recent years, many small travel agencies have emerged due to the rapid development of China's tourism industry, but these new travel agencies are not professional and have a negative impact, which is consistent with scholars' research result of low operational efficiency of China's travel agencies.

5. China's tourism consumption(x_4) reflects the demand for tourism. An increase in demand will lead to more consumption. When "picky" consumers increase, their demand is higher. In order to meet the demands of consumers, Chinese tourism companies will improve their management and level, launch more high-level and high-quality tourism services, and make China's tourism industry more diversified and specialized, which is conducive to improving China's tourism competitiveness. Therefore, domestic tourism consumption has a significant impact on the international competitiveness of the tourism industry.

6.The financing amount(x_5) of tourism enterprises and the application of e-commerce(x_8) are indicators used to measure the supporting industries. A significance level test of 5% shows that tourism enterprises, especially small and medium-sized ones, face difficulties in financing, have low financing repayment rates, and some may even go bankrupt due to failure to repay loans on time after financing. Combining information technology, digital technology, and modern tourism enterprises not only improves the production efficiency of enterprises, but also revolutionizes the industry structure. The combination of 5G, big data, apps and the tourism industry is becoming increasingly close, providing valuable assistance

for the future recovery of the tourism industry and playing a positive role in supporting the expansion of China's tourism industry's international competitiveness.

7.Based on the empirical analysis results and the PEST model, a problem-solving approach can be outlined. From a political perspective, there are certain problems with the current financing of tourism enterprises, and the government should improve the financing system for tourism enterprises. From an economic perspective, improving the economic structure and actively encouraging the development of the tertiary industry, especially the tourism industry, can enhance the level of economic development and people's living standards. From a social perspective, encouraging international cultural exchanges is important, as the quality of tourism practitioners is closely related to tourism competitiveness, improving the service level of the tourism industry from the perspective of practitioners and tourists to meet the high-level tourism demand. From a technological perspective, the tourism industry can utilize e-commerce technologies such as VR, AI, and AR to achieve smart management and promote the management through online platforms.

8.Based on the current situation of China's tourism industry and the results of empirical analysis, the researcher believe that improving the competitiveness of the tourism industry cannot be solved by a single aspect and requires three levels of involvement: national strategic level, social and economic industry level, and tactical level of tourism enterprises. From the government's perspective: effectively developing tourism resources and adhering to sustainable development; improving relevant laws and regulations and strengthening law enforcement; and enhancing the quality of tourism practitioners. From the industry perspective: developing supporting industries, extending the industry chain; innovating enterprise management models; promoting industry integration and comprehensively upgrading tourism formats. From the enterprise perspective: improving service quality and level, providing differentiated services; expanding diversified overseas markets and implementing cross-border business strategies; actively implementing a "going out" strategy and seeking overseas investment opportunities.

It is the "soul" of "innovation" of tourism market and "new combination" of

production factors to cultivate excellent tourism entrepreneur class and construct high-quality tourism entrepreneur team. Kensuke Matsushita, a famous Japanese entrepreneur, believes that 70% of the responsibility for the rise and fall of an enterprise should be borne by the operator. In modern enterprises, every increase of an "effective manager" can achieve 1:6 economic effect, which shows the key role of enterprise managers in economic operation. Strengthen tourism entrepreneur team cultivation, the growth of tourism entrepreneur team to create a good social and economic environment, improve tourism entrepreneur evaluation as soon as possible, appointment, promotion mechanism, develop scientific system of training plan, strengthening supervision and constraint mechanism, etc., through a variety of ways, in order to improve the comprehensive quality of the management.

The mechanism for managing the tourism industry based on e-commerce has proven to be an important element in the strategic development of the tourism sector. The use of e-commerce in tourism management allows you to improve the accessibility and convenience of services for tourists, providing them with a wide range of choices and personalized offers. Electronic platforms allow you to make reservations, purchase tickets, and receive information online, which contributes to effective interaction between tourists, hotels and other stakeholders. Artificial intelligence technologies and data analysis allow you to improve marketing strategies and adapt them to changes in demand and trends. The growing use of e-commerce in the travel industry also poses the challenge of ensuring cybersecurity and protecting data privacy. Overall, the management mechanism of the tourism industry based on e-commerce is proving to be a key factor in improving the competitiveness and efficiency of the industry in a rapidly changing digital environment.

The study of the system of the market of tourism services with the use of computer technologies, with a special emphasis on the context of China, indicates significant transformations in the field of tourism, which are determined by a large number of features of an innovative approach to the use of information technology. China has seen a rapid expansion in the use of mobile apps and electronic payment

systems in the tourism industry, greatly simplifying and facilitating the process of planning and booking trips for millions of users. An important aspect is also the high activity in the field of virtual tourism and the use of immersive technologies, which makes the tourist experience more exciting and advanced. It is noted that innovative approaches in the field of data analysis and artificial intelligence help in creating personalized and effective travel offers. However, in the context of China, where internet censorship and restrictions on access to some foreign platforms may affect global integration, it is important to consider technological improvements in the context of local realities. The findings of this study point to the importance of adapting global technological innovations to specific market conditions in China in order to maximize their impact and effectiveness in the tourism industry.

The construction of a modern enterprise management system in the tourism industry is an important step towards increasing the competitiveness and efficiency of enterprises in this sector. The study devoted to the development of such a system highlights the key aspects that determine the success of modern management in the tourism business. The implementation of this system involves not only the automation of operations and management processes, but also an emphasis on the use of analytical tools for strategic decision-making. The importance of integrating e-commerce tools and technology to optimize customer service and improve customer experience is highlighted. Considering the specifics of the tourism business, special attention is paid to the development of a quality management system and service standards. The key conclusions of the study indicate that building a modern management system in the tourism industry is a strategic necessity that allows enterprises not only to compete effectively in the global market.

CONCLUSION

In the context of economic globalization, the globalization of the tourism industry has not only brought severe challenges and impacts to China's tourism industry but also provided good opportunities and prospects. Tourism consumption is a high-level form of modern society's consumption, which can combine material consumption with cultural consumption. The tourism industry is an important component of the tertiary industry, which has the advantages of low investment, high returns, and low pollution, and has therefore been dubbed "smokeless industry" and "invisible trade." In recent years, China's tourism industry has developed rapidly and has become an important industry and a new growth point of the national economy. With the deepening development of free trade, the position of service trade in foreign trade has become increasingly prominent. As the most important part of service trade sector, inbound and outbound tourism has become an important weapon for countries to participate in competition. Although China has a large scale in the tourism industry and the number of inbound tourists and international tourism foreign exchange income has been increasing year by year, since 2010, China's tourism service trade has showed a deficit, and the deficit has gradually expanded in recent years. China has abundant tourism resources, but the overall competitiveness of tourism service trade is not strong. In order to reverse the deficit and improve competitiveness, how to improve China's international competitiveness in the tourism industry is a hot topic currently being researched in this field.

This study conducts research on the international competitiveness of the tourism industry, first describing the current situation of China's tourism industry from the overall scale of tourism development, inbound and outbound tourist numbers and foreign exchange income, and related industry development, and analyzing the advantages and disadvantages of China's participation in international competition in the tourism industry. Secondly, the study calculates indicators of China's tourism industry's international competitiveness, such as the trade competitive advantage index, the revealed comparative advantage index, and

international market share, and compares them horizontally with Germany, Japan, Spain, the United States, Thailand, and Ukraine, and concludes that China's international competitiveness in the tourism industry is weak. Thirdly, based on Porter's Diamond Model, the study conducts a qualitative analysis of factors of production factors, demand conditions, related industries, and enterprise strategies, and selects the RCA index as the dependent variable, and number of scenic spots, the number of tourism majors, China's tourism consumption, the number of hotels, railway and airline mileages, the number of travel agencies, the financial support for the development of tourism enterprises, and e-commerce technology as the independent variables, and establishes a model for quantitative analysis. Based on the description of the current situation of China's tourism industry, the calculation of competitiveness indicators, and the qualitative and quantitative analysis of influencing factors, the study proposes suggestions for improving China's international competitiveness in the tourism industry from the perspectives of government, industry, and enterprises, using Porter's Diamond Theory and the PEST model.

1.Clarifying basic concepts of tourism industry, tourism management, tourism activities, and the development of tourism industry competitiveness are crucial in tourism competitiveness research, so they need to be defined first. Then, the economic theories used to measure China's tourism competitiveness are explored. Based on literature review, comparative advantage theory, resource endowment theory, and international competitiveness theory are the theoretical foundations for a country's tourism industry competitiveness, providing theoretical support for analyzing China's international tourism competitiveness. Evaluating tourism industry competitiveness is comprehensive, and currently, economic indicators such as International Market Share (IMS), Revealed Comparative Advantage (RCA), and Trade Competitiveness (TC) are commonly used to evaluate a country's tourism industry international competitiveness.

2. Because there are many factors that affect a country's tourism competitiveness, and they often have cross-cutting effects, it is not possible to

examine a single aspect in isolation. Therefore, Porter's diamond theory is used to analyze the factors: production factors, demand conditions, supporting industries, the firm's strategy, and the government and opportunities. Porter's diamond theory involves political, economic, social, and technological aspects, and hence, four aspects need to be addressed to address China's current low competitiveness.

3.Through a literature review, the current situation of China's tourism industry from the establishment of New China to the present day is outlined. Since 2010, the growth rate of China's tourism industry imports has been greater than that of exports, resulting in a gradual shift from a surplus to a deficit, which is showing an expanding trend. In terms of inbound tourist sources, the majority are from Asia, while the European market is weak. In terms of inbound tourist destinations in China, more tourists go to the eastern region than to the western region, indicating a development trend of "strong in East Strong and weak in West " in China's tourism industry. From the perspective of inbound tourism revenue and composition, the revenue from tickets and transportation accounts for a large proportion, while souvenirs and related consumption products are few, resulting in a low added value. As for outbound tourists, with the improvement of the Chinese people's living standards and the increase in studying abroad and business trips, the number of outbound tourists is continuously increasing.

4.This study elucidates the evaluation system of China's tourism industry competitiveness and calculates it based on corresponding indicators. The indicators selected in this study include the market share of the tourism market (IMS), trade competitiveness index (TC), revealed comparative advantage index (RCA), and Vollrath’s revealed relative comparative advantage index (VRCA) to analyze the index of international tourism competitiveness of China, the United States, Japan, Thailand, Spain, Germany, and Ukraine. China's tourism competitiveness index is similar to Ukraine's, but there is still a large gap compared with developed countries, which is consistent with the world tourism competitiveness rankings. Through the analysis of these competitiveness indicators, it is found that China's tourism industry has weak competitiveness, and China is a tourism power of quantity, but not of

quality.

5.Based on the theory of national competitive advantage proposed by Michael Porter, a Harvard University professor, known as the "Diamond Model," this study analyzes the factors that affect a country's tourism competitiveness, including production factors, demand factors, supporting industries, enterprise strategic structure and inter-industry competition, as well as the role of government and opportunities. With the development of information technology, China has put forward the development of "smart tourism" and other proposals, and e-commerce has rapidly developed in the tourism industry, which has spurred the transformation of the tourism industry. Scenic spots, hotels, and transportation industries actively use artificial intelligence, virtual reality, and other technologies to promote the development of China's tourism industry.

6.Based on the selection principles of indicators, the development of the tourism industry, and the availability of data, certain variables were selected. The number of scenic spots, the number of tourism employees, tourism demand and consumption income, tourism enterprise financing amount, number of star-rated hotels, number of travel agencies, railway and flight mileages, and e-commerce technology were selected as the explanatory variables, and the RCA of tourism competitiveness was selected as the dependent variable. Considering the difference in dimensions, these variables were standardized.

7.After conducting correlation analysis, a correlation test was performed on the independent and dependent variables, followed by multiple linear regression analysis. The adjusted R^2 value was 97.1%, indicating that each variable could effectively explain the dependent variable. However, based on the p-values and significance of each variable coefficient, none of the variables were significant. These results were unexpected and differed from the correlation analysis and expectations, indicating that the model was not reasonable and needed to be tested and adjusted.

8. According to the multicollinearity test and heteroscedasticity test, the model

had severe multicollinearity, with the VIF of the railway and flight mileages(x_6) and the number of star-rated hotels(x_7) being the highest. Therefore, these three variables were removed, and the remaining indicators were regressed again to establish the adjusted model.

9.According to the results of the adjusted model regression, the number of tourist attractions(x_1), the number of tourism majors(x_2), tourism consumption in China(x_4), and e-commerce application(x_8) were positively correlated with China's tourism competitiveness. The number of travel agencies(x_3) and tourism enterprise financing amount(x_5) were negatively correlated with China's tourism competitiveness. Empirical analysis showed that the production factors, demand factors, enterprise strategy structure and competition, and supporting industry had an impact on China's international competitiveness in tourism.

10. Based on the empirical analysis results and the PEST model, strategies to address the problems were outlined. Considering the current situation of China's tourism industry and the results of empirical analysis, the researcher believed that improving tourism competitiveness is not about a one-sided solution and needs to involve three levels: national strategic level, socio-economic industry level, and tourism enterprise tactical level. This also confirms the analysis of the "diamond model", where multiple factors work together to promote the development of China's tourism competitiveness.

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APPENDICES

Normalized Value

Year	X1	X2	X3	X4	X5	X6	X7	X8	Y
2005	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46
2006	0.01	0.03	0.02	0.07	0.01	0.27	0.00	0.14	0.46
2007	0.00	0.05	0.04	0.13	0.01	0.29	0.05	0.15	0.31
2008	0.02	0.04	0.06	0.12	0.02	0.30	0.08	0.20	0.27
2009	0.03	0.07	0.07	0.18	0.02	0.32	0.13	0.36	0.31
2010	0.03	0.09	0.07	0.30	0.04	0.34	0.16	0.37	0.27
2011	0.04	0.11	0.11	0.20	0.05	0.35	0.19	0.38	0.24
2012	0.04	0.16	0.13	0.22	0.01	0.38	0.20	0.40	0.25
2013	0.04	0.17	0.14	0.18	0.06	0.41	0.22	0.38	0.25
2014	0.04	0.22	0.13	0.32	0.15	0.43	0.25	0.51	0.16
2015	0.06	0.22	0.15	0.34	0.52	0.51	0.34	0.56	0.17
2016	0.06	0.24	0.13	0.35	0.49	0.56	0.36	0.57	0.18
2017	0.10	0.24	0.23	0.50	0.67	0.65	0.35	0.62	0.09
2018	0.10	0.27	0.25	1.00	0.98	0.71	0.28	0.64	0.05
2019	0.15	0.27	0.35	0.83	0.32	0.71	0.28	0.71	0.00
2020	0.15	0.33	0.38	0.48	0.33	0.70	0.30	0.66	0.03

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TOP	2019	2022
1	Spain	Japan
2	France	United States
3	Germany	Spain
4	Japan	France
5	United States	Germany
6	UnitedKingdom	Switzerland
7	Australia	Australia
8	Italy	UnitedKingdom
9	Canada	Singapore
10	Switzerland	Italy