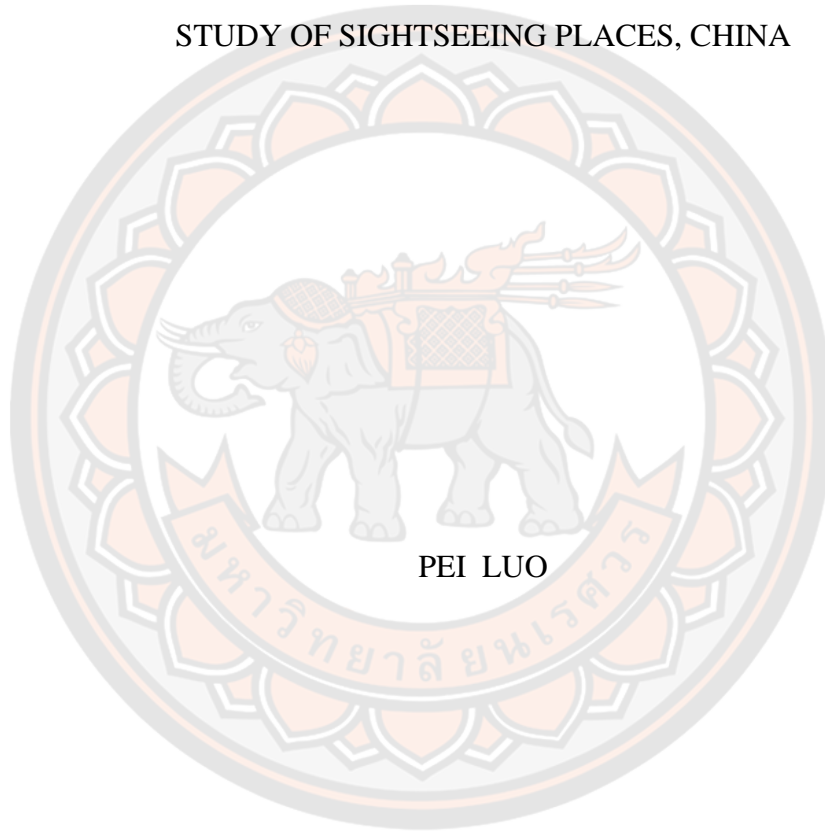




MEASUREMENT OF TOURIST ATTRACTION PERFORMANCE: A CASE
STUDY OF SIGHTSEEING PLACES, CHINA



A Thesis Submitted to the Graduate School of Naresuan University
in Partial Fulfillment of the Requirements
for the Master of Science in Logistics and Supply Chain

2022

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Thesis entitled "Measurement of Tourist Attraction Performance: A Case Study of
Sightseeing Places, China"

By Pei Luo

has been approved by the Graduate School as partial fulfillment of the requirements
for the Master of Science in Logistics and Supply Chain of Naresuan University

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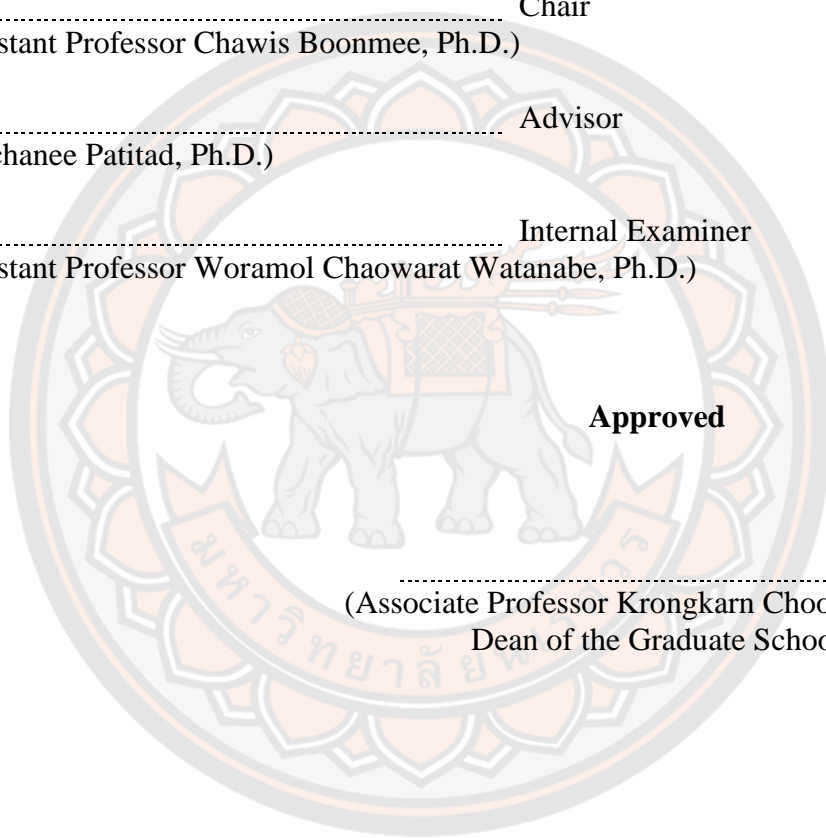
..... Chair
(Assistant Professor Chawis Boonmee, Ph.D.)

..... Advisor
(Patchanee Patitad, Ph.D.)

..... Internal Examiner
(Assistant Professor Woramol Chaowarat Watanabe, Ph.D.)

Approved

.....
(Associate Professor Krongkarn Chootip, Ph.D.)
Dean of the Graduate School



Title	MEASUREMENT OF TOURIST ATTRACTION PERFORMANCE: A CASE STUDY OF SIGHTSEEING PLACES, CHINA
Author	Pei Luo
Advisor	Patchanee Patitad, Ph.D.
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ABSTRACT

With the development of economy, tourism industry is increasingly popular. The competition in tourism business is very intense. Performance measurement is an important technique to evaluate the efficiency of tourism industry. The tourism industry includes many stakeholders, such as suppliers, tour operators, travel agency, tourist attraction and tourist. At present, there are few researches on performance measurement model of the tourist attraction. Hence, this research develops a performance measurement tool of tourist attraction. The performance indicators are prioritized by utilizing the Analytic Hierarchy Process (AHP) method. To verify the proposed performance measurement tool, two sightseeing places in China are selected to evaluate their performance by the tool. The performance results are compared with a standard performance measurement tool of China, that is China's tourist attractions rating system. With the Chinese rating system, the China's sightseeing places are scored and categorized into five levels from high score to low score, namely AAAAA, AAAA, AAA, AA and A. By the comparing, the results show scores from the proposed performance measurement tool are coincident with the China's tourist attractions rating system in both two sightseeing places.

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Special thanks must be my friends in NU, for their kindness, warmth and those happy times we were staying together. Especially my friends Lin Mei, Yaosheng Wu, and Xinfang Zhang, who encourage me, support me and hold me accountable for my progress.

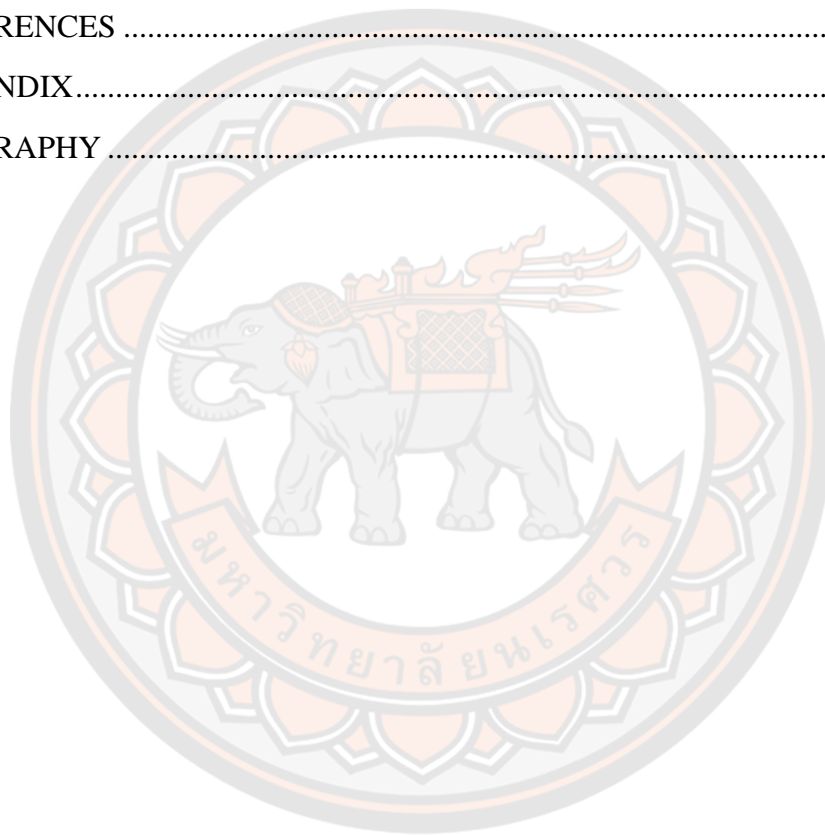
Last but not least, I want to express all my love to my family, especially my father Guanglin Luo and my mother Feng'e Tang. Their support and encouragement has given me the strength and fighting spirit to finish my thesis.

Pei Luo

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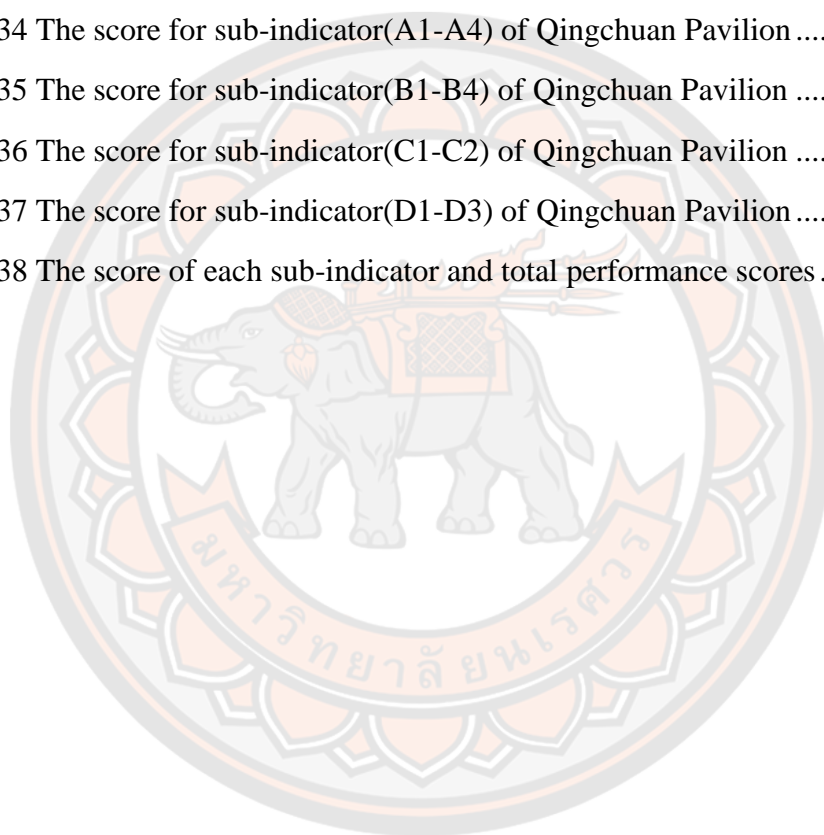
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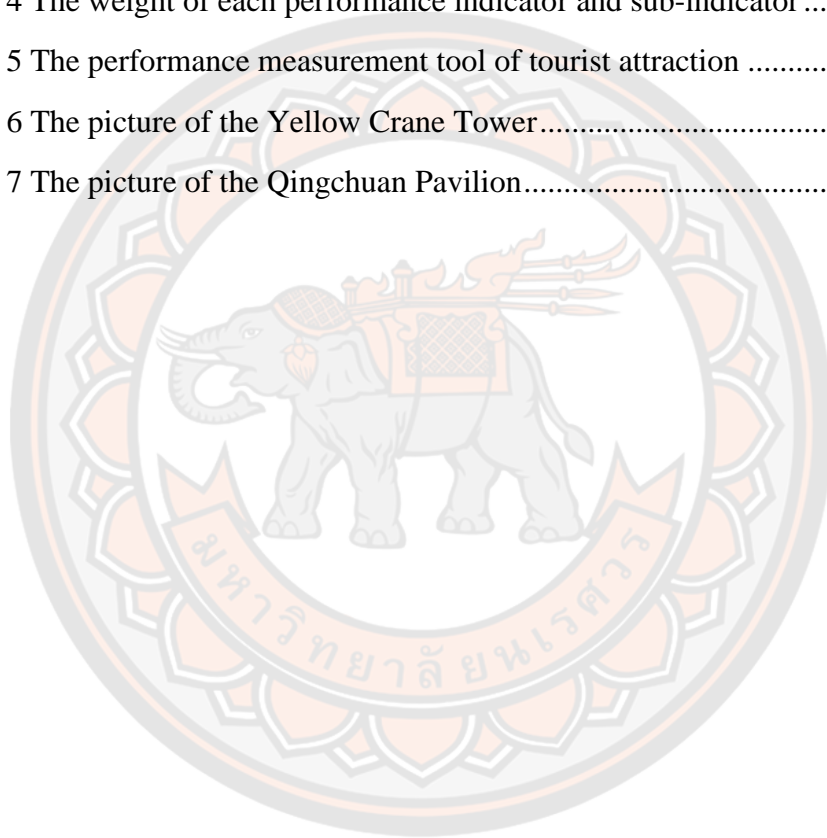
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ABBREVIATION

AHP	=	Analytic Hierarchy Process
TSC	=	Tourism Supply chain
MCDM	=	Multi-Criteria Decision-Making
FCE	=	Fuzzy Comprehensive Evaluation
ROA	=	Return on Assets
ROI	=	Return on Tourism Investment
SAW	=	Simple Additive Weighting
IOC	=	Index of Item-Objective Congruence



CHAPTER I

INTRODUCTION

Background of the Research

The tourism industry plays an important role, and competition is increasingly fierce. Many people like to travel around the world to release stress and enjoy life with rapid economic development in recent years. The data shows that in 2018, the total number of international tourist arrivals (overnight tourists) reached 1.4 billion, significantly higher than 3.7% of global economic growth (UNWTO, 2019). As COVID-19 has lasted for several years, the economy of many regions and countries has declined. In order to avoid COVID-19 infection and respond to national policies, many people have less opportunities to travel. After the COVID-19 policy is released, many people cannot wait to travel. Therefore, the growth of the tourism industry is very rapid. The rapid growth of tourism shows that the industry is one of the most powerful drivers of economic growth and development today.

The popularity of the tourism industry makes the study of tourism vital. Tourism involves many components, including restaurants, accommodation, transportation, entertainment, trade, and tourist attraction. Thus, there are many stakeholders in tourism. Tourist attraction drive the development of surrounding hotels, restaurants, entertainment, and other activities, thereby driving the economic development of the entire region. It can be seen that tourist attractions are an essential component of the tourism industry, driving the development of the entire industry. Therefore, as the most essential part of the tourism industry, the research on tourist attractions is irresistible. From the perspective of relevant literature, scholars' research on tourist attraction started in the 1990s, focusing on tourism development and management, tourism environment and sustainable development, tourism resources and environmental protection, tourism enterprise governance, tourist attraction value evaluation, etc. (Wang, 2013).

Performance measurement is quite important to verify the efficiency of Tourist Attraction. The management guru Peter Drucker once said: "If you want to manage, you must first make an evaluation " (Li, 2008). Kaplan and Norton (1992) state that no measures, and no improvement. It can be seen that it is particularly urgent to develop effective evaluation tool for tourist attraction. Through performance evaluation, tourism decision-makers can supervise tourist attractions, clarify the operation status of the enterprise, find problems, and solve problems in time.

With the in-depth development of tourism, some tourist attractions lack effective performance evaluation and corresponding management countermeasures after development and operation, leading to the focus of attention on the sustainable development of tourist attractions. Therefore, in the development process, tourist attractions need to handle the relationship between development and protection, taking into account the integration of economic, social, and environmental benefits. However, how to construct performance measurement indicators for tourist attractions to diagnose their effectiveness, guide their performance management, and promote sustainable tourism development has become a hot topic in the development of tourist attractions (Wang, 2013).

At present, there are few researches on performance measurement model of the tourist attraction. Yilmaz and Bititci (2006) stated that most tourism literatures are about market-oriented, especially the hotel dimension. They do not mainly focus on the performance measurement of tourist attractions. Atkinson and BranderBrown (2001) emphasized that many tourism companies still use traditional performance measurement systems to stress short-term performance and ignore long-term performance drivers. They believe that practical performance evaluation should present the comprehensiveness of indicators, not only concern financial performance but non-financial performance. Therefore, how to build performance evaluation indicators to solve the objective, comprehensive, and accurate comprehensive evaluation of tourist attractions has just entered the research field of scholars.

This research develops a performance measurement tool for tourist attractions from a comprehensive perspective in order to provide useful help for their performance evaluation and management. The performance indicators are prioritized by utilizing the Analytic Hierarchy Process (AHP) method. To verify the proposed

performance measurement tool, two sightseeing places in China are selected to evaluate their performance by the tool.

Research Aim

The goal of this research is to develop the performance measurement tool of the tourist attraction. The performance indicators are prioritized by utilizing the Analytic Hierarchy Process (AHP) method to improve tourist attraction performance.

Objectives

The objectives of this research are:

1. To identify performance evaluation indicators of the tourist attraction.
2. To weigh the importance of the performance evaluation indicators.
3. To develop a performance measurement tool for the tourist attraction.

Research Significance

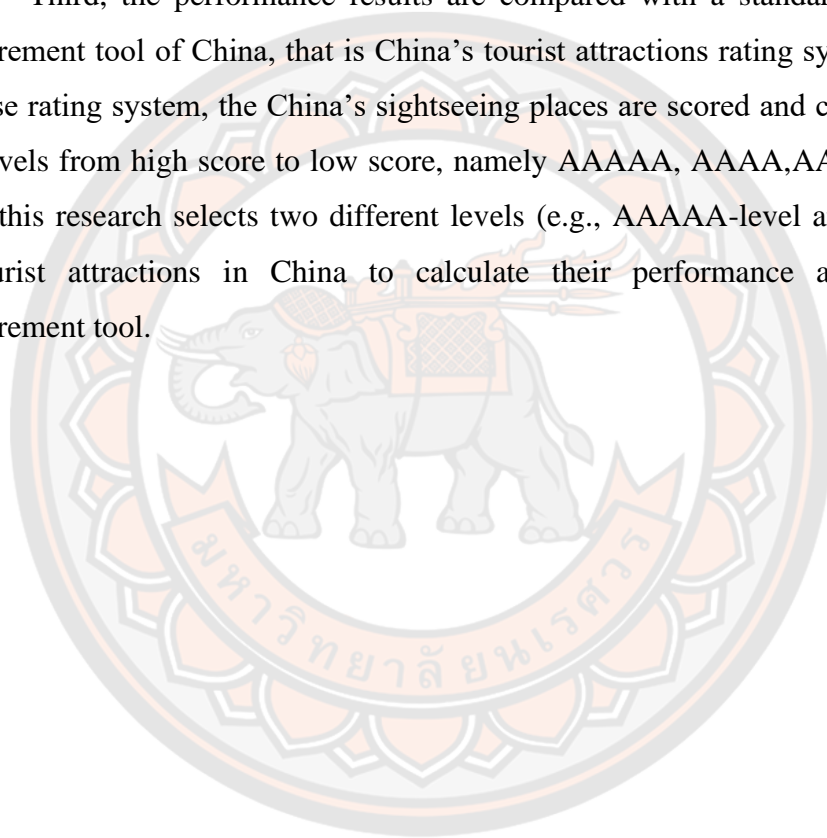
This research focuses on the performance measurement of the tourist attraction. This research develops a performance measurement tool for the tourist attraction to assist tourism organizations in measuring their performance. In addition, this research enables tourism company managers to know more clearly which critical elements are more important for improving their performance according to the weight of performance indicators. The performance measurement result assists the tourism company in getting the direction for improving their performance in tourist attraction.

Research Scope

First, this research obtains performance indicators of tourist attraction from related research. Then, the weight of each indicator is calculated based on experts scoring. In order to avoid the subjectivity of expert scoring, six experts are interviewed, including three academic experts and three tourism organization experts. Specifically, academic experts must be experts with doctoral degrees, and tourism organization experts must be tourism organization managers with more than five years of work experience.

Second, two tourist attractions in China are selected to evaluate their performance using the measurement tool proposed in this research. According to the content of the tourist attraction, China's tourist attractions are mainly divided into seven types, including ancient ruins, historical buildings, natural scenic spots, tourist resorts, museums, and theme parks. China has a vast territory, a diverse ecological environment, and rich natural scenic spots. Therefore, this research selects two natural scenic spots as research objects.

Third, the performance results are compared with a standard performance measurement tool of China, that is China's tourist attractions rating system. With the Chinese rating system, the China's sightseeing places are scored and categorized into five levels from high score to low score, namely AAAAA, AAAA, AAA, AA and A. Thus, this research selects two different levels (e.g., AAAAA-level and AAA-level) of tourist attractions in China to calculate their performance and verify the measurement tool.



CHAPTER II

LITERATURE REVIEWS

In this section, relevant principles that are applied in this study and related literature are reviewed. Firstly, the current tourism situation, the concept of tourism supply chain, and the relationship between tourist attraction and tourism supply chain are shown. Secondly, the contents and methods of performance evaluation of tourism-related enterprises in existing researches are reviewed, and the performance indicators of tourist attraction are established through relevant literature. Finally, the AHP method for calculating performance indicator weights in this research and its application are introduced.

Tourism and its situation

With the rapid development of the economy, tourism industry has developed rapidly in recent years. The total number of international tourist arrivals (overnight tourists) reached 1.4 billion in 2018, significantly higher than 3.7% of global economic growth (UNWTO, 2019). In 2017, the total number of global tourists (including domestic and international tourists) reached 11.88 billion people, 1.6 times the global population; the total global tourism revenue reached 5.3 trillion dollars, accounting for 6.7% of global GDP (Ke, 2018). Global travel and total income growth rate were 6.8% and 4.3% in 2017, respectively, which was faster than manufacturing (4.2%), retail and wholesale (3.4%), agriculture, forestry and fisheries (2.6%), financial services industry (2.5%) (Ke, 2018). Tourism has surpassed the global economic growth rate for the seventh consecutive year and has become the fastest-growing industry globally.

As a sustainable development industry, tourism is indispensable role in many countries. As stated by the United Nations Tourism Development Board: tourism and emerging e-tourism are critical to the economies of developing countries as they are a significant source of income and employment and a major factor in promoting the development of other economic activities (UNTD, 2002). In the past, most scholars'

research concentrated on the manufacturing industry. However, the rapid development of tourism in recent years has led experts and scholars to start researching the tourism industry. Research on tourism can help promote the vigorous development of tourism, drive the development of other industries and contribute to the national economy.

Tourism Supply Chain and Tourist Attraction

Christopher (1992), a well-known American supply chain expert, pointed out that the competition among modern enterprises has gradually turned into a competition between supply chain and supply chain in the 21st century. A supply chain comprises seven main business processes: customer relationship management, customer service management, demand management, order fulfillment, manufacturing flow management, procurement, product development, and commercialization (Cooper, Lambert, & Pagh, 1997). The concept of supply chain management has become increasingly popular since it was first proposed by Houlihan in 1985 (Houlihan, 1985). However, there is still no uniform definition of supply chain management for global recognition. The most popular definition is that “a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system-wide costs while satisfying service level requirements” (Simchi & Levi, 2000). Supply chain management has been widely used in product manufacturing to improve the efficiency of the entire value chain, including the efficiency of logistics and planning activities and material and information control, not only internally, within companies, but also externally, between companies (Christopher, 1992).

Although previous research on supply chain has focused on manufacturing, research on tourism supply chain has grown in recent years. From a value perspective, the author believes TSC is an independent supply chain composed of different activities, stakeholders, and different functional businesses (Page, 2003). From a tourism activities perspective, the authors believe that TSC is a network of tourism organizations composed of participants from supply to distribution to final marketing, and includes participants in both the private and the public sectors (Zhang, Song, and Huang, 2009). Tapper and Font (2004) believe that TSC includes all individuals and

organizations that provide tourism products and services, including suppliers, travel agencies, and terminal visitors, even including waste recycling and disposal. Generally speaking, the tourism supply chain mainly includes four components, travel suppliers, travel operators, travel agencies, and customers (Kaukal et al., 2000; Smith & Xiao, 2008; Weiermair, 2005). Figure 1 shows the general mode of the tourism supply chain. The supplier provides transportation, hotel, restaurants, and other primary tourism products. The travel operators are generally responsible for designing tourism products, developing tourist routes, promoting tourism products, and selling products to travel agencies. The travel agency includes the group agency and the land agency. The land agency is responsible for maintaining a close business relationship with the supplier and provides ground reception services for the terminal tourists after they arrive at the destination. The group agency is between the land agency and the terminal tourists and refers to the enterprise responsible for marketing tourism products and services (L. Yang & B. Y. Yang, 2008). Zhang et al. (2009) believed that the ultimate goal of the tourism supply chain is the tourists' satisfaction, that is, the degree of satisfaction of tourists with the received tourism products and services.

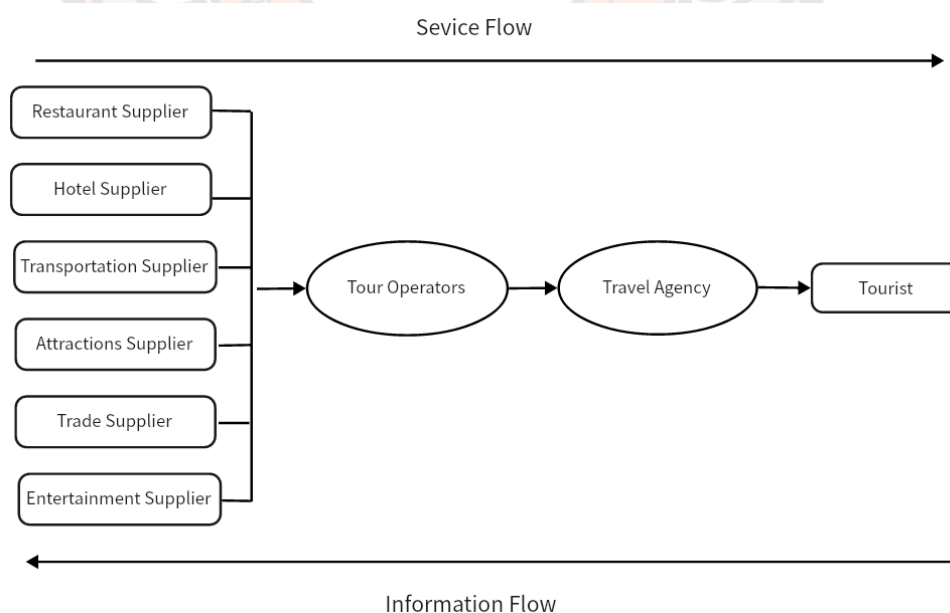


Figure 1 The general mode of tourism supply chain

The rapid development of tourism has made the tourism industry increasingly competitive. In order to enhance competitiveness, research on the tourism supply chain is indispensable. Currently, research on tourism supply chain focuses on the basic structure of tourism supply chain, coordination and cooperation of tourism node enterprises, and related research on tourism destinations. The basic structure of the tourism supply chain includes restaurants, hotels, transportation, attractions suppliers, tour operators, travel agents, and tourists (Kaukal, Werthner, & Hoepken, 2000). Since the tourism industry involves many fields, research on the tourism supply chain is essential but complex. However, as the critical factor that drives tourists to travel is tourist attraction, research on tourist attractions is significant. Assaf and Tsionas (2015) think destination quality plays an important role in the tourism industry. Because the quality and the service of the destination largely determine the visitors' satisfaction.

Tourist attractions are the core elements of the tourism industry and the central link of the tourism supply chain. Thus, This research focuses on the crucial parts of the tourism supply chain: tourist attraction. Tourist attractions refer to independent management areas with specific regional places to attract tourists, can meet tourists' tourism needs such as sightseeing, recreation, fitness, knowledge, etc., and should have corresponding tourism service facilities and provide complementary tourism services.

Tourist Attraction performance

Tourist attraction performance measurement is an analysis and evaluation of the tourist attraction(Zhang, 2013). Through the appropriate evaluation indicator and practical comprehensive evaluation method, the evaluation result of the tourist attraction performance is finally obtained. The evaluation result is of great significance for measuring the achievement of the tourist attraction goals, providing operational decision support, and improving overall efficiency.

Thus, the research on the performance measurement of tourist attraction is vital for sustainable tourism industry development. Some researchers focus on hotel performance in the tourism industry. Phillips and Louvieris (2005) designed overall performance measurement systems based on the Balanced ScoreCard for hotel and

leisure firms. Huang, Ho, and Chiu (2014) developed a modified two-stage model to evaluate the productive efficiency, occupancy, and catering service effectiveness of Taiwan's international tourist hotels. Tigu and Calaretu (2013) researched and analyzed tourist traffic indicators and measurement of customer satisfaction to highlight how hotel demand management affects supply chain performance. Some researchers focus on the performance of tourist destinations. Tsionas and Assaf (2014) used a new dynamic stochastic frontier model to model tourist destination technical efficiency in the short and long term. Huang and Coelho (2017) developed a systematic approach to measure sustainability performance by economic, social, environmental, and wildlife indicators on a coral reef in tourism. Yilmaz and Bititci (2006) developed a unique tourism value chain model that allowed various players to communicate and coordinate tourism activities from customer and internal dimensions to evaluate overall tourism performance. However, few researchers focus on performance of tourist attractions.

Tourist attraction performance and its index

To evaluate performance, appropriate performance indicators should be established first. Research on tourism industry performance is mainly from financial performance, operational performance, and overall performance. Financial performance mainly evaluates financial efficiency by constructing different financial indicator systems to analyze the status quo and make decisions. For example, Yilmaz and Bititci (2006) evaluated and analyzed the financial performance of the hotel supply chain in order to understand the operation status of the hotel. Operational performance is mainly to assess the quality of tourism products or services and the response time of tourists. The overall performance of the tourism industry is mainly based on the overall perspective of the tourism industry to assess the satisfaction of tourists with tourism services and the evaluation of the elasticity (Zhang et al., 2009). Atkinson and BranderBrown (2001) thought more effective performance measurement should include linking operations to strategic goals and presenting a balance of indicators instead of just considering short-term performance. He used the UK hotel as an example to illustrate that the traditional performance system only considers financial indicators and ignores some important issues. Huang (2018) built a

hybrid network data envelopment analysis (DEA) model in order to assess the performance of tourism as well. As he emphasized that we should not only measure the division performance but evaluate all components. Therefore, this research extracted the comprehensive performance indicators through relevant literature. Comprehensive performance indicators not only include financial performance but also include non-financial performance. Table 1 shows the indicators of the tourist attraction performance from literature review based on the Balanced Score Card (BSC). The Balanced Scorecard is one of the common performance evaluation methods, which is a new type of performance management system that implements an organization's strategy into actionable measurement indicators and target values from the perspectives of finance, customers, internal operations, and learning and growth. The Balanced Scorecard method breaks through the use of finance as an essential measurement tool, achieving a balance in multiple aspects. The Balanced Scorecard reflects the balance between financial and non-financial measurement methods, the balance between long-term and short-term goals, the balance between external and internal factors, the balance between results and processes, and the balance between management performance and operational performance. It can reflect the comprehensive operational status of the organization, make performance evaluation be balanced and improved, and be conducive to the long-term development of the organization.

Table 1 The indicators of tourist attraction performance.

Indicators	Amount	Reference	Indicators Explanation
Overall profitability			
1. Return on Assets (ROA)	5	Bai, Pu, and Zhu (2015), Phillips and Louvieris (2005), C. Wang (2015), Y. T. Zhang (2015), Y. Wang (2014)	Net profits / Average total assets*100%
2. Tourism income growth rate	4	Bai et al., (2015), L. D. Wang (2008), C. Wang (2015), Tan (2016)	Growth of tourism income this year / Total tourism income in the previous year*100%
3. Tourism profit growth rate	9	X. J. Huang (2009), Bai et al., (2015), Phillips and Louvieris (2005), Atkinson and BranderBrown (2001), C. Wang (2015), Y. T. Zhang (2015), Tan (2016), J. Z. Chen (2013), Y. Wang (2014)	Growth of net profit this year / Net profit in the previous year*100%
4. Return on Tourism Investment (ROI)	5	X. J. Huang (2009), Bai et al., (2015), C. Wang (2015), Y. T. Zhang (2015), J. Z. Chen (2013)	(Current Value of Investment - Cost of Investment) / Cost of Investment*100%
Overall service level			
1. Tourist satisfaction	16	Torres-Delgado and Palomeque (2018), Meng (2018), T. K. Xin and J. K. L. Chan (2014), X. J. Huang (2009), Bai et al., (2015), L. D. Wang (2008), Bezerra and Gomes (2018), Phillips and Louvieris (2005), C. Wang (2015), Y. Y. Chen (2014), Y. T. Zhang (2015), D. Wu (2011), Tan (2016), Y. J. Guan and L. Zhang (2016), J. Z. Chen (2013), L. J. Huang and P. Yu (2012)	Number of tourists satisfied / Total number of tourists*100%
2. Tourist	14	T. K. Xin and J. K. L. Chan	Number of tourists

Indicators	Amount	Reference	Indicators Explanation
complaint rate		(2014), X. J. Huang (2009), Bai et al., (2015), Bezerra and Gomes (2018), C. Wang (2015), B. Wang (2017), Y. Y. Chen (2014), W. X. Wu (2017), T. Chen and W. Li (2013), Yang, Sun, and Zhang (2015), Tan (2016), J. Liu (2010), Y. Zhang (2013), Y. Wang (2014)	complaining / Total number of tourists*100%
3. Providing service ratio on time	7	X. J. Huang (2009), B. Wang (2017), W. X. Wu (2017), T. Chen and W. Li (2013), Yang et al., (2015), J. Liu (2010), Y. Zhang(2013)	Number of services provided on time / Total number of services provided*100%
4. Service flexibility	9	Bai et al., (2015), Y. T. Zhang (2015), W. X. Wu (2017), T. Chen and W. Li (2013), J. Liu (2010), Y. Zhang (2013), J. Z. Chen (2013), L. J. Huang and P. Yu (2012), Y. Wang (2014)	Number of new services / Total number of services*100%
Competitiveness			
1. Market share	11	Meng (2018), X. J. Huang (2009), L. D. Wang (2008), Atkinson and BranderBrown (2001), B. Wang (2017), Y. T. Zhang (2015), W. X. Wu (2017), T. Chen and W. Li (2013), Tan (2016), J. Liu (2010), Y. Zhang (2013)	Total number of tourists received / Total number of tourists received in the province*100%
2. Tourist growth rate	5	Meng (2018), L. D. Wang (2008), Y. T. Zhang (2015), Yang et al., (2015), Tan (2016)	(The total number of tourists in the current period - The total number of tourists in the previous period) / The total number of tourists in the previous period*100%
Coordinated development capability			

Indicators	Amount	Reference	Indicators Explanation
1. Cooperation trust	5	X. J. Huang (2009), B. Wang (2017), J. Liu (2010), Y. Zhang (2013), Y. Wang (2014)	The degree of trust between tourist attraction and their cooperative enterprises.
2. Distortion rate of information transmission	4	B. Wang (2017), J. Liu (2010), Y. Zhang (2013), Y. Wang (2014)	Number of error information / total number of information passed*100%
3. Coordinated decision-making ability	2	W. X. Wu (2017), T. Chen and W. Li (2013)	Coordination and command ability in the process of tourism activities

Those indicators are divided into four classes (Overall profitability, Overall service level, Competitiveness, and Coordinated development capability) based on the Balanced Score Card. Overall profitability is a financial indicator, while Overall service level, Competitiveness, and Coordinated development capability are non-financial indicators. The comprehensive performance measurement of the tourist attraction can help managers to make decisions better and improve the performance of the tourist attraction, and benefit coordination and cooperation between tourism enterprises. Therefore, this research measures the comprehensive performance of the tourist attraction, not only include financial performance, but also include non-financial performance.

Overall profitability(A) includes four indicators: Return on Assets (ROA), Tourism income growth rate, Tourism profit growth rate, and Return on Tourism Investment. Many authors consider these indicators to reflect the overall profitability. The explanation for each indicator is as follows.

- Return on Assets (ROA)(A1): ROA is an indicator used to measure how much net profit is generated per unit of assets. Return on Assets can be calculated as:

$$\text{Return on Assets} = \frac{\text{Net profits}}{\text{Average total assets}} \times 100\%$$

- Tourism income growth rate(A2): The growth rate of tourism income refers to the ratio of tourism income compared to each other in different periods, which

reflects the average growth level of tourism income in different periods. Tourism income growth rate can be calculated as:

$$\text{Tourism income growth rate} = \frac{\text{Growth of Tourism income this year}}{\text{Total tourism income in the previous year}} \times 100\%$$

- Tourism profit growth rate(A3): The growth rate of tourism profit refers to the ratio of tourism profit compared to each other in different periods, which reflects the average growth level of tourism profit in different periods. Tourism profit growth rate can be calculated as:

$$\text{Tourism profit growth rate} = \frac{\text{Growth of net profit this year}}{\text{Net profit in the previous year}} \times 100\%$$

- Return on Tourism Investment (ROI)(A4): ROI refers to the economic return that a company receives from investing in a business activity. It is a ratio used to measure a company's profitability and is a comprehensive indicator of its operational effectiveness and efficiency. Return on Tourism Investment can be calculated as:

$$\text{Return on Tourism Investment} = \frac{(\text{Current Value of Investment} - \text{Cost of Investment})}{\text{Cost of Investment}} \times 100\%$$

Overall service level(B) includes four indicators, namely Tourist satisfaction, Tourist complaint rate, Providing service ratio on time and Service flexibility. These indicators are considered by many authors to reflect the overall Overall service level. The explanation for each indicator is as follows.

- Tourist satisfaction(B1): Tourist satisfaction is a comprehensive psychological evaluation of tourists on the degree to which the products or services provided by tourist attraction meet their needs for tourism activities. Tourist satisfaction can be calculated as:

$$\text{Tourist satisfaction} = \frac{\text{Number of tourists satisfied}}{\text{Total number of tourists}} \times 100\%$$

- Tourist complaint rate(B2): Tourist complaints refer to tourists who subjectively believe that due to errors in tourism service work, they have not been able to enjoy the expected satisfactory service. Tourist complaint rate can be calculated as:

$$\text{Tourist complaint rate} = \frac{\text{Number of tourists complaining}}{\text{Total number of tourists}} \times 100\%$$

- Providing service ratio on time(B3): Providing service ratio on time refers to the rate of tourist attraction providing promised services at the agreed time. Providing service ratio on time can be calculated as:

$$\text{Providing service ratio on time} = \frac{\text{Number of services provided on time}}{\text{Total number of services provided}} \times 100\%$$

- Service flexibility(B4): As a kind of ability to quickly respond to changes in customer demand, service flexibility plays an important role in service provision, service management competition strategy and service organization competitive advantage. Service flexibility can be calculated as:

$$\text{Service flexibility} = \frac{\text{Number of new services}}{\text{Total number of services}} \times 100\%$$

Competitiveness(C) includes two indicators, namely Market share and Tourist growth rate. The explanation for each indicator is as follows.

- Market share(C1): Market share refers to the proportion of the number of tourists in a tourist attraction and the number of tourists in the province, which largely reflects the competitive position of the tourist attraction. Market share can be calculated as:

$$\text{Market share} = \frac{\text{Total number of tourists received}}{\text{Total number of tourists received in the province}} \times 100\%$$

- Tourist growth rate(C2): Tourist growth rate can be calculated as:

Tourist growth rate =

$$\frac{(\text{The total number of tourists in the current period} - \text{The total number of tourists in the previous period})}{\text{The total number of tourists in the previous period}} \times 100\%$$

Coordinated development capability(D) includes three indicators, namely Cooperation trust, Distortionrate of information transmission and Coordinated decision-making ability. The explanation for each indicator is as follows.

- Cooperation trust(D1): The degree of trust between tourist attraction and their cooperative enterprises.

- Distortion rate of information transmission(D2): During the cooperation process with travel agencies and other companies, tourist attraction may encounter inaccurate information transmission when communicating information about tourism products and services. Distortion rate of information transmission can be calculated as:

$$\text{Distortion rate of information transmission} = \frac{\text{Number of error information}}{\text{Total number of information passed}} \times 100\%$$

- Coordinated decision-making ability(D3): Coordinated decision-making ability refers to coordination and command ability in the process of tourism activities. In tourism activities, a variety of situations will occur. It is very important for the managers of tourist attractions and cooperative enterprises to coordinate and deal with various situations.

Whether the indicators proposed in this research are necessary will be analyzed by using the index of item-objective congruence (IOC) technique. The index of item-objective congruence (IOC) developed by Rovinelli and Hambleton (1977) is a procedure used in test development for evaluating content validity at the item development stage. Experts evaluate each item by giving the item a rating of 1, 0, or -1 for each objective. 1 refers to that the item definitely measures the objective. 0 refers to the uncertainty of whether the item measures the objective. -1 refers to that the item does not measure the objective. The IOC is determined through expert investigation methods. At least three experts should participate in the evaluation ($N \geq 3$), preferably three or more; The more, the better. Index of item-objective congruence (IOC) is calculated as:

$$IOC = \text{Sum}(R)/N$$

Where, R is the value of the item.

N is the number of experts participating in the survey.

Brown (2005) mentions that if the index of the IOC is between 0.5 and 1.00, it suggests that the item is acceptable because the item meets the survey objectives; If IOC falls below 0.5, it means that the item is not fitting, and must be removed or reviewed.

Analytic Hierarchy Process (AHP) and its Applications

AHP was developed by T. L. Saaty, an American operations researcher, in the mid-1970s, who officially proposed a relatively simple, practical, and flexible hierarchical multi-criteria decision-making (MCDM) analysis method, which mainly provides an excellent solution to some complicated and fuzzy problems (Saaty, 1980).

AHP is widely adopted in various fields by many scholars and practitioners. J. Lee and H. Lee (2015) proposed the creation of tourism policies by 13 experts. They used AHP method to calculate the priority of policies, as well as the study showed that it was appropriate to adopt AHP to obtain the policy priority of the tourism industry. Zhou, Maumbe, Deng, & Selinet (2015) used hybrid AHP to measure tourist destination competitiveness to obtain which aspects have advantages, and hybrid AHP proved to be a reliable tool for assessing destination competitiveness. Moreover, many researchers integrated AHP and other methods to achieve better results. Qin and Zhao (2015) built a performance evaluation index system for the tourism supply chain and used AHP-FCE method to evaluate the performance. Ajmera, Singh, and Satia (2015) combined AHP method and SWOT analysis to calculate the priority of SWOT factors, improve the strategic decision-making process for medical tourism industry in India, and make a reference contribution to the Indian medical tourism industry. Wang et al. (2016) used factors analysis to select tourists' essential evaluation items on smart tourism attractions and combined FCEM-AHP and IPA methods to measure tourist preferences on smart tourism attractions, as well as make a guide by a numerical analysis for related researchers and practitioners.

The procedure for using the AHP can be summarized as (Saaty, 1990):

1. Model the problem as a hierarchy containing the decision goal, the alternatives for reaching it, and the criteria for evaluating the alternatives.

In this research, the decision goal is performance measurement of tourist attraction; the criteria consist of overall profitability, overall service level, competitiveness, and coordinated development capability, which are proposed based on Balanced Scorecard; the sub-criteria include 13 indicators for evaluating four criteria.

2. Calculate the priority vectors (Eigenvector) among the elements of the hierarchy by making a series of judgments based on pairwise comparisons of the elements.

This step can be done by building pairwise comparison matrix, which determines the relative importance between each criterion and each sub-criteria with the help of experts, e.g., researcher, professors, or experienced managers in the field of tourist attraction.

In the pairwise comparison matrix, matrix A is a $n \times n$ real matrix, where n is the number of evaluation criteria considered. Each a_{ij} of the matrix A represents the importance of the i th criterion relative to the j th criterion.

$a_{ij} > 1$, represents the i th criterion is more important than the j th criterion,

$a_{ij} < 1$, represents the i th criterion is less important than the j th criterion.

$a_{ij} = 1$, represents two criteria that have the same importance.

The a_{ij} and a_{ji} must satisfy the following constraint: $a_{ij} = \frac{1}{a_{ji}}$

The relative importance between the two criteria is measured using a numerical scale from 1 to 9, as shown in Table 2.

Table 2 The numerical scale for pairwise comparison.

Value of a_{ij}	Definition
1	i and j are equally important.
3	i is slightly more important than j.
5	i is more important than j.
7	i is strongly more important than j.
9	i is absolutely more important than j.
2,4,6,8	Intermediate values are used to represent a compromise between the importance listed above

From the pairwise comparison matrix A , the normalized pairwise comparison matrix A_{norm} is derived by making equal to 1 with the sum of its column, i.e. entries a_{ij} of the matrix A_{norm} is calculated as

$$a_{ij} \rightarrow = \frac{a_{ij}}{\sum_{l=1}^n a_{lj}}$$

Finally, the weight vector of the criteria is obtained by averaging the entries on each row of A_{norm} , i.e.,

$$\omega_i = \frac{\sum_{l=1}^n a_{il}}{n}$$

3. Check the consistency of the judgments.

AHP allows some small inconsistency in judgment because human is not always consistent. The Consistency Ratio (CR) is calculated as:

$$CR = \frac{CI}{RI} \times 100\%$$

Where, CI is Consistency Index, $CI = \frac{\lambda_{max} - n}{n - 1}$

RI is Random Consistency Index. The value of RI is shown in Table 3.

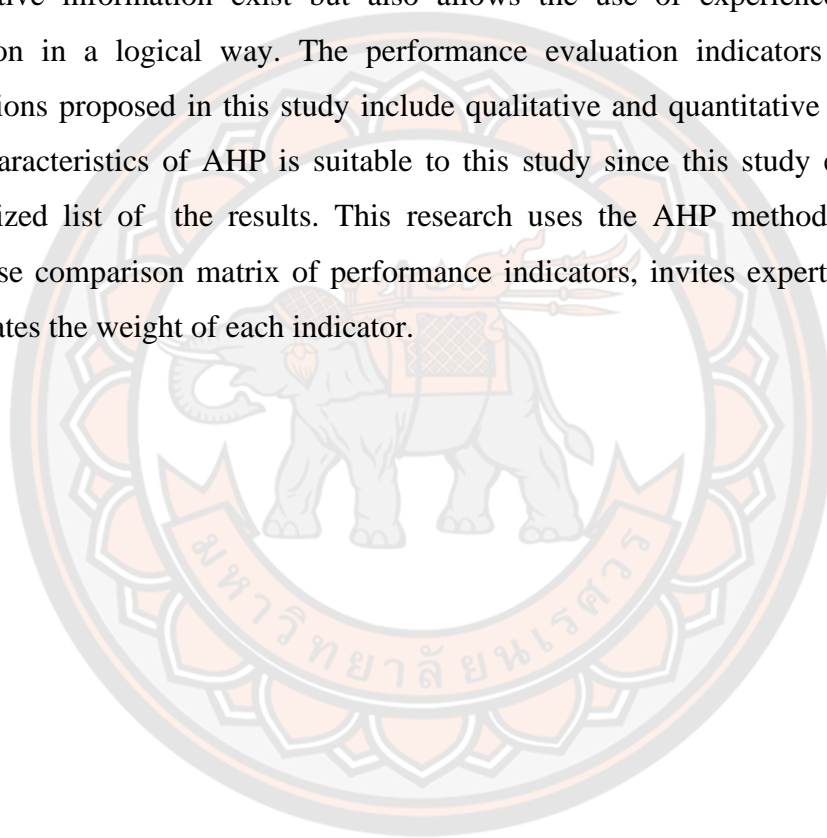
Table 3 The value of Consistency Index (CI).

n	1	2	3	4	5	6	7	8	9	10
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45	1.49

If the value of consistency ratio is smaller or equal to 10%, the inconsistency is acceptable.

If the value of consistency ratio is greater than 10%, the experts need to judge again until the consistency ratio is smaller or equal to 10%.

This research uses AHP method to measure the performance of tourist attractions. AHP is a systematic and hierarchical analysis method combining qualitative and quantitative. AHP applies not only to situations where uncertainty and subjective information exist but also allows the use of experience, insight, and intuition in a logical way. The performance evaluation indicators of the tourist attractions proposed in this study include qualitative and quantitative indicators, and the characteristics of AHP is suitable to this study since this study emphasizes the prioritized list of the results. This research uses the AHP method to establish a pairwise comparison matrix of performance indicators, invites experts to score, and calculates the weight of each indicator.



CHAPTER III

RESEARCH METHODOLOGY

This chapter presents the research procedure of this research. It starts with the research methodology of this study. After that, the data collection process and data analysis are explained. Finally, the performance measurement tool is established.

The flow chart of this research methodology is illustrated in Figure 2. Precisely, the process for conducting this research mainly consists of 6 steps:

Step 1: Identify performance indicators on tourist attraction. Review many relevant literatures and identify indicators for measuring tourist attraction performance.

Step 2: Design questionnaires. To test whether all the indicators proposed in this study are necessary, a survey questionnaire is designed based on IOC technique. In order to obtain the priority of the final selected indicators, a paired comparison survey questionnaire is designed.

Step 3: Collect data. Invite six experts from the tourism industry to fill out the two questionnaires designed in the previous step. The six experts are three academic experts with doctoral degrees and three tourism organization managers with more than five years of work experience.

Step 4: Calculate the weight of performance indicators. Based on the collected survey questionnaire data, calculate the weight of each indicator using the Analytic Hierarchy Process (AHP) method and test its consistency.

Step 5: Design a performance measurement tool. In order to get the score of each performance indicator and calculate the total performance score of tourist attractions, a performance measurement tool is designed.

Step 6: Verify the tool. Verify the measurement tool by two case studies. This research selects two sightseeing places of different levels as research objects in China. The performance results are calculated according to the measurement tool and compared with the levels of tourist attraction in China.

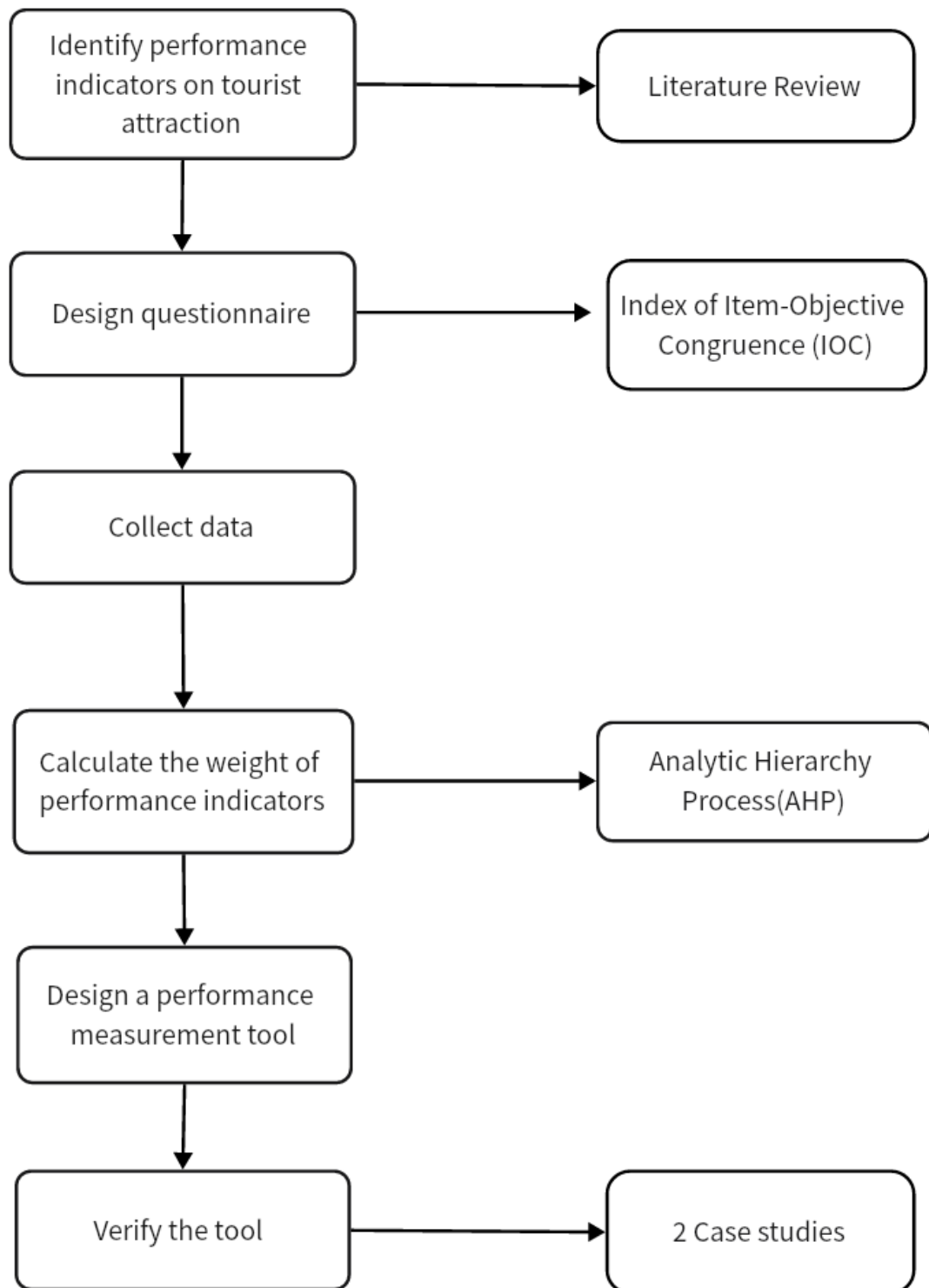


Figure 2 Research Methodology

Population and Samples

China is a country with rich tourism resources. It has magnificent mountains and rivers, countless historical sites, rich ethnic customs, precious animals and plants, and world-famous operas and cuisines. It attracts domestic and foreign tourists every year. China's sightseeing places are mainly divided into seven types: ancient ruins, historical buildings, natural scenic spots, tourist resorts, museums, and theme parks. The quality level of sightseeing places in China is divided into five levels from high to low, followed by AAAAA, AAAA, AAA, AA, and A-level sightseeing places. According to the World Tourism Organization, in the future, China will become the world's largest tourist destination country.

Thus, this research chose two different levels (e.g., AAAAA-level and AAA-level) of natural scenic spots in China to calculate their performance and verify the measurement tool.

Research Instrument and data used

This research used SPSSAU to calculate the weights of each performance indicator based on AHP method. Moreover, SPSSAU can directly check the consistency of the experts' scores.

This research also used Microsoft Excel to calculate Normalize Geometric Mean of weights.

Data Collection

As mentioned in Chapter 2, this research uses IOC technique to detect whether all the indicators proposed in this study are necessary. The author invited six experts to rate each indicator for the objective (experts are the same as those invited in the paired comparison questionnaire). The rating of six experts and the calculation results of IOC are shown in table 4.

For example, the IOC of Overall profitability(A)=(1+1+1+1+1+1)/6=1.

Table 4 The calculation results of IOC of six experts

Interviewee	1	2	3	4	5	6	IOC=Sum (R) /N
Overall profitability(A)	1	1	1	1	1	1	1
Overall service level(B)	1	1	1	1	0	1	0.833333333
Competitiveness(C)	0	1	1	1	1	1	0.833333333
Coordinated development capability(D)	1	1	1	0	1	1	0.833333333
Return on Assets (A1)	1	1	0	1	1	1	0.833333333
Tourism income growth rate(A2)	1	0	1	1	1	1	0.833333333
Tourism profit growth rate(A3)	1	0	1	1	1	1	0.833333333
Return on Tourism Investment(A4)	1	1	1	0	1	1	0.833333333
Tourist satisfaction(B1)	1	1	1	1	1	1	1
Tourist complaint rate(B2)	1	1	1	0	1	1	0.833333333
Providing service ratio on time(B3)	0	1	1	1	1	1	0.833333333
Service flexibility(B4)	0	1	1	1	1	1	0.833333333
Market share(C1)	1	1	1	1	1	1	1
Tourist growth rate(C2)	1	1	1	0	1	1	0.833333333
Cooperation trust(D1)	1	1	1	1	1	1	1
Distortion rate of information transmission (D2)	1	1	1	0	1	1	0.833333333
Coordinated decision-making ability(D3)	0	1	1	1	1	1	0.833333333

From this table, it can be seen that the IOC of each indicator is higher than 0.5. Brown (2005) mentions that if the index of the IOC is between 0.5 and 1.00, it suggests that the item is acceptable. Therefore, these indicators proposed in this study are necessary to reflect the performance of tourist attractions.

This research designed a questionnaire of pairwise comparison of indicators based on previous literature. The survey questionnaire can be found in appendix 1. According to the previous chapter, the performance indicators are divided into four classes: Overall profitability(A), Overall service level(B), Competitiveness(C), and Coordinated development capability(D). In order to help survey respondents make judgments better, the following are detailed explanations of these indicators. The calculation formula for indicators is the same as in Chapter 2.

Overall profitability(A) includes four indicators: Return on Assets (ROA), Tourism income growth rate, Tourism profit growth rate, and Return on Tourism Investment. The explanation for each indicator is as follows.

- Return on Assets (ROA)(A1): This research uses ROA to reflect the profit generated by each unit of assets in tourist attractions. Return on Assets can be calculated as:

$$\text{Return on Assets} = \frac{\text{Net profits}}{\text{Average total assets}} \times 100\%$$

- Tourism income growth rate(A2): This research uses the tourism income growth rate to reflect the percentage of tourism income growth this year in last year's tourism income, which is one of the indicators reflecting the overall profitability of tourist attraction. Tourism income growth rate can be calculated as:

$$\text{Tourism income growth rate} = \frac{\text{Growth of Tourism income this year}}{\text{Total tourism income in the previous year}} \times 100\%$$

- Tourism profit growth rate(A3): This research uses the tourism profit growth rate to reflect the ratio of profit growth this year compared to the previous year as one of the indicators of the overall profitability of tourist attraction. Tourism profit growth rate can be calculated as:

$$\text{Tourism profit growth rate} = \frac{\text{Growth of net profit this year}}{\text{Net profit in the previous year}} \times 100\%$$

• Return on Tourism Investment (ROI)(A4): This research uses ROI to reflect the economic returns of tourist attraction from the development of tourism projects, which can well measure the overall profitability of the tourist attractions. Return on Tourism Investment can be calculated as:

$$\text{Return on Tourism Investment} = \frac{(\text{Current Value of Investment} - \text{Cost of Investment})}{\text{Cost of Investment}} \times 100\%$$

Overall service level(B) includes four indicators, namely Tourist satisfaction, Tourist complaint rate, Providing service ratio on time and Service flexibility. The explanation for each indicator is as follows.

• Tourist satisfaction(B1): This research uses tourist satisfaction to reflect tourists' evaluation of products or services in tourist attractions, which can directly reflect whether tourists are satisfied with the tourism. Tourist satisfaction can be calculated as:

$$\text{Tourist satisfaction} = \frac{\text{Number of tourists satisfied}}{\text{Total number of tourists}} \times 100\%$$

• Tourist complaint rate(B2): This research uses the tourist complaint rate to reflect the dissatisfaction of tourists during the tourism process as one of the indicators reflecting the overall service level of the tourist attraction. Tourist complaint rate can be calculated as:

$$\text{Tourist complaint rate} = \frac{\text{Number of tourists complaining}}{\text{Total number of tourists}} \times 100\%$$

- Providing service ratio on time(B3): This research uses the providing service ratio on time to reflect whether tourist attractions provide tourism services to tourists on time, and this indicator also reflects the overall service level of tourist attractions. Providing service ratio on time can be calculated as:

$$\text{Providing service ratio on time} = \frac{\text{Number of services provided on time}}{\text{Total number of services provided}} \times 100\%$$

- Service flexibility(B4): This research uses service flexibility to reflect whether tourist attractions can quickly respond to tourists' needs in the event of sudden changes and to appease tourists' dissatisfaction with service changes and make appropriate compensation. Service flexibility can be calculated as:

$$\text{Service flexibility} = \frac{\text{Number of new services}}{\text{Total number of services}} \times 100\%$$

Competitiveness(C) includes two indicators: Market share and Tourist growth rate. The explanation for each indicator is as follows.

- Market share(C1): This research uses market share to reflect the competition between this tourist attractions and other tourist attractions. Market share can be calculated as:

$$\text{Market share} = \frac{\text{Total number of tourists received}}{\text{Total number of tourists received in the province}} \times 100\%$$

- Tourist growth rate(C2): This research uses the growth rate of tourists to reflect the trend of tourist growth in the tourist attraction, thereby reflecting the competitive position of the tourist attraction. Tourist growth rate can be calculated as:

$$\text{Tourist growth rate} = \frac{\text{The total number of tourists in the current period} - \text{The total number of tourists in the previous period}}{\text{The total number of tourists in the previous period}} \times 100\%$$

Coordinated development capability(D) includes three indicators: Cooperation trust, Distortion rate of information transmission and Coordinated decision-making ability. The explanation for each indicator is as follows.

- Cooperation trust(D1): This research uses cooperation trust indicator to reflect the degree of trust between tourist attractions and other enterprises to reflect the coordinated development capability between tourism companies.

- Distortion rate of information transmission(D2): This research uses the distortion rate of information transmission to reflect the error rate in information communication and transmission between tourist attraction and other tourism enterprises, in order to reflect the coordinated development capability between tourism enterprises. Distortion rate of information transmission can be calculated as:

$$\text{Distortion rate of information transmission} = \frac{\text{Number of error information}}{\text{Total number of information passed}} \times 100\%$$

- Coordinated decision-making ability(D3): This research uses coordinated decision-making ability to reflect whether tourist attractions and other tourism enterprises can coordinate and handle various situations during the tourism activity.

The questionnaire was distributed to academic experts and tourism organization experts to score for indicators. Specifically, academic experts must be experts with doctoral degrees, and tourism organization experts must be tourism organization managers with over five years of work experience. Academic experts have achieved certain results in the field of scientific research and have delved deeply into knowledge about the tourism industry so that they can provide correct theoretical guidance for this study. Experts in tourism organizations, who have been rooted in the tourism industry for many years, are able to gain a deep understanding of the real-time dynamics of the tourism industry and provide guidance for this study based on the actual situation of the tourism industry.

Due to the fact that this research is based on Chinese sightseeing places, the invited experts are all Chinese. In order to send a survey questionnaire to collect data, university professors majoring in tourism were searched online. Approximately 30 academic experts were invited and ultimately received responses from 3 experts. Three experts who have worked in tourism organizations for more than 5 years were

searched and contacted them. After discussing the meaning of each performance indicator, these three experts rated the indicators. When selecting these experts, a background check was conducted online, and they were experts who had made certain achievements in their field and had sufficient experience and status. Therefore, the responses received from the six experts can guide this study and have good reference value.

Data Analysis

This research uses the AHP method to calculate the weight of each indicator. Figure 3 shows performance indicators for tourist attraction and the explanation of each indicator based on the AHP model.



Figure 3 Performance indicators based on AHP model

According to the questionnaire of three academic experts with doctoral degrees and three tourism organization experts with over five years of work experience, the author calculated each indicator's weight using the AHP method. AHP consists of 3 main steps as follows (Taking the weight calculation of the four indicators of Overall profitability, Overall service level, Competitiveness, and Coordinated development capability as an example based on interviewee 1):

Step1 : The Pairwise Comparison Matrix

The summarization of the ratio in each column of the pairwise comparison matrix will be applied to the next step, matrix normalization.

Table 5 The Pairwise Comparison Matrix of Interviewee 1

Interviewee 1	Overall profitabilit y(A)	Overall service level(B)	Competitivene ss(C)	Coordinated development capability(D)
Overall profitability(A)	1	3	1	0.143
Overall service level(B)	0.333	1	1	0.143
Competitiveness(C)	1	1	1	0.143
Coordinated development capability(D)	7	7	7	1
Column summation	9.333	12	10	1.429

Step 2: Matrix normalization

This step is to normalize the matrix by the total number of each column. Each cell is be divided by the sum of the same column to yield its normalized score to obtain an eigenvector, which is applied to create comparative weighing in each matrix.

Table 6 Matrix normalization of Interviewee 1

Interviewee 1	Overall profitability (A)	Overall service level(B)	Competitiveness (C)	Coordinated development capability(D)	Row summation	Eigen Vector
Overall profitability(A)	0.10715	0.25000	0.10000	0.10007	0.55722	0.13930
Overall service level(B)	0.03568	0.08333	0.10000	0.10007	0.31908	0.07977
Competitiveness (C)	0.10715	0.08333	0.10000	0.10007	0.39055	0.09764
Coordinated development capability(D)	0.75003	0.58333	0.70000	0.69979	2.73315	0.68329
Total	1.00000	1.00000	1.00000	1.00000	4.00000	1.00000

Step 3: Check the consistency

The acceptable Consistency Ratio (CR) value should be less than 0.1. If CR value is more than 0.1, AHP procedure needs to be modified and repeated from the interview for CR verification.

Table 7 Consistency Measure of Interviewee 1

Interviewee 1	Overall profitability (A)	Overall service level(B)	Competitiveness (C)	Coordinated development capability(D)	Eigen Vector	Consistency measure
Overall profitability (A)	1	3	1	0.143	0.1393	0.57396
Overall service level(B)	0.333	1	1	0.143	× 0.07977	= 0.32151
Competitiveness (C)	1	1	1	0.143	0.09764	0.41442
Coordinated development capability(D)	7	7	7	1	0.68329	2.90027

After calculation for consistency measuring by MMULT function in Excel, the average of the consistency measure are required to obtain λ_{max} , which is calculated by

$$\lambda_{\max} = (0.57396/0.1393 + 0.32151/0.07977 + 0.41442/0.09764 + 2.90027/0.68329)/4$$

$$\lambda_{\max} = 4.159$$

$$CI = \frac{\lambda_{\max} - n}{n - 1} = (4.159 - 4)/(4 - 1) = 0.053$$

The Consistency Ratio (CR) is calculated as:

$$CR = \frac{CI}{RI} \times 100\% = 0.053/0.89 = 0.06$$

CR value is acceptable. Therefore, the judgments of the expert are consistent.

The Pairwise Comparison Matrix and weights of indicators of Interviewee 1 as shown in table 8 below.

Table 8 Weights of Indicators of Interviewee 1

Interviewee 1	Overall profitability (A)	Overall service level (B)	Competitiveness (C)	Coordinated development capability (D)
Overall profitability(A)	1	3	1	0.143
Overall service level(B)	0.333	1	1	0.143
Competitiveness(C)	1	1	1	0.143
Coordinated development capability(D)	7	7	7	1
Weights	13.929%	7.976%	9.762%	68.333%
$\lambda_{\max}=4.159$	CI=0.053	RI=0.89	CR=0.06	

Repeat the above method to obtain the indicator weights of each expert, as shown in the table below.

Table 9 Weights of Indicators of Interviewee 2

Interviewee 2	Overall profitability (A)	Overall service level (B)	Competitiveness (C)	Coordinated development capability (D)
Overall profitability(A)	1	3	5	5
Overall service level(B)	0.333	1	3	3
Competitiveness(C)	0.2	0.333	1	1
Coordinated development capability(D)	0.2	0.333	1	1
Weights	55.495%	25.165%	9.670%	9.670%
$\lambda_{\max}=4.044$	CI=0.015	RI=0.89	CR=0.016	

Table 10 Weights of Indicators of Interviewee 3

Interviewee 3	Overall profitability (A)	Overall service level (B)	Competitiveness (C)	Coordinated development capability (D)
Overall profitability(A)	1	3	1	0.2
Overall service level(B)	0.333	1	1	0.2
Competitiveness(C)	1	1	1	0.2
Coordinated development capability(D)	5	5	5	1
Weights	17.159%	9.886%	12.159%	60.795%
$\lambda_{\max}=4.158$	CI=0.053	RI=0.89	CR=0.059	

Table 11 Weights of Indicators of Interviewee 4

Interviewee 4	Overall profitability (A)	Overall service level (B)	Competitiveness (C)	Coordinated development capability (D)
Overall profitability(A)	1	3	3	3
Overall service level(B)	0.333	1	1	3
Competitiveness(C)	0.333	1	1	3
Coordinated development capability(D)	0.333	0.333	0.333	1
Weights	48.125%	21.042%	21.042%	9.792%
$\lambda_{\max}=4.155$	CI=0.052	RI=0.89	CR=0.058	

Table 12 Weights of Indicators of Interviewee 5

Interviewee 5	Overall profitability (A)	Overall service level (B)	Competitiveness (C)	Coordinated development capability (D)
Overall profitability(A)	1	7	3	3
Overall service level(B)	0.143	1	0.333	0.333
Competitiveness(C)	0.333	3	1	1
Coordinated development capability(D)	0.333	3	1	1
Weights	54.441%	6.884%	19.337%	19.337%
$\lambda_{\max}=4.008$	CI=0.003	RI=0.89	CR=0.003	

Table 13 Weights of Indicators of Interviewee 6

Interviewee 6	Overall profitability (A)	Overall service level (B)	Competitiveness (C)	Coordinated development capability(D)
Overall profitability(A)	1	3	1	3
Overall service level(B)	0.333	1	0.333	1
Competitiveness(C)	1	3	1	3
Coordinated development capability(D)	0.333	1	0.333	1
Weights	37.500%	12.500%	37.500%	12.500%
$\lambda_{max}=4$	CI=0	RI=0.89	CR=0	

The data obtained after normalize geometric mean of the weights of each indicator above are as follows(The following data are all percentage data):

Table 14 Normalize geometric mean of weights of indicators

Weights of Interviewee	1	2	3	4	5	6	Geometric mean	Normalize geometric mean
Overall profitability(A)	13.93	55.50	17.16	48.13	54.44	37.50	33.05	39.86
Overall service level(B)	7.98	25.17	9.89	21.04	6.88	12.50	12.38	14.93
Competitiveness (C)	9.76	9.67	12.16	21.04	19.34	37.50	16.11	19.44
Coordinated development capability(D)	68.33	9.67	60.80	9.79	19.34	12.50	21.36	25.77

The geometric mean is the n-th power root of the product of n variables.

$$G = \sqrt[n]{X_1 \times X_2 \times \dots \times X_n}$$

The geometric mean is calculated by the GEOMEAN function in Excel.

Normalize geometric mean=Geometric mean / Sum of geometric mean column×100%

The calculation method for the weights of the sub-indicators is the same as above, and the results are as follows (The following data are all percentage data):

Table 15 Normalize geometric mean of weights of sub-indicators (A1-A4)

Weights of Interviewee	1	2	3	4	5	6	Geometric mean	Normalize geometric mean
Return on Assets (A1)	9.89	39.89	6.06	48.44	48.44	30.00	23.49	26.25
Tourism income growth rate(A2)	17.16	8.32	23.72	13.02	13.02	10.00	13.38	14.95
Tourism profit growth rate(A3)	36.48	16.07	39.92	22.40	16.15	30.00	25.16	28.12
Return on Tourism Investment (A4)	36.48	35.72	30.30	16.15	22.40	30.00	27.46	30.68

Table 16 Normalize geometric mean of weights of sub-indicators (B1-B4)

Weights of Interviewee	1	2	3	4	5	6	Geometric mean	Normalize geometric mean
Tourist satisfaction (B1)	26.70	60.80	51.94	62.80	54.96	54.44	50.11	54.11
Tourist complaint rate(B2)	51.34	17.16	7.89	6.37	9.79	6.88	12.00	12.95
Providing service ratio on time(B3)	10.09	12.16	20.09	15.42	19.71	19.34	15.61	16.86
Service flexibility (B4)	11.88	9.89	20.09	15.42	15.54	19.34	14.90	16.08

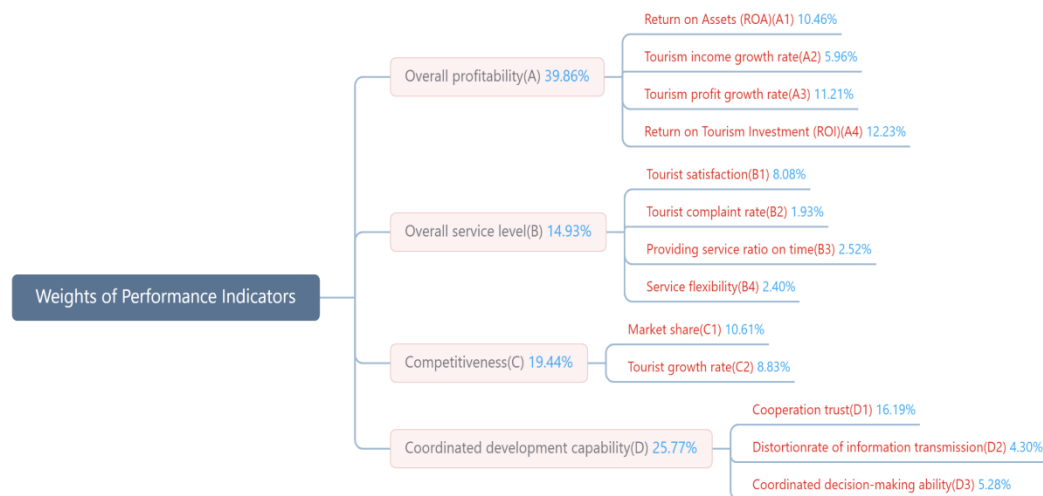
Table 17 Normalize geometric mean of weights of sub-indicators(C1-C2)

Weights of Interviewee	1	2	3	4	5	6	Geometric mean	Normalize geometric mean
Market share(C1)	75.00	50.00	50.00	75.00	50.00	25.00	50.99	54.56
Tourist growth rate(C2)	25.00	50.00	50.00	25.00	50.00	75.00	42.46	45.44

Table 18 Normalize geometric mean of weights of sub-indicators(D1-D3)

Weights of Interviewee	1	2	3	4	5	6	Geometric mean	Normalize geometric mean
Cooperation trust(D1)	46.67	63.34	47.96	66.87	71.43	60.00	58.63	62.81
Distortion rate of information transmission (D2)	46.67	10.62	11.50	8.82	14.29	20.00	15.59	16.70
Coordinated decision-making ability(D3)	6.67	26.05	40.55	24.31	14.29	20.00	19.12	20.49

The following diagram clearly shows the weight of each performance indicator, as shown in Figure 4.

**Figure 4 The weight of each performance indicator and sub-indicator**

Among the four performance indicators(Overall profitability(A), Overall service level(B), Competitiveness(C), and Coordinated development capability(D)), overall profitability(A) is the most important indicator, accounting for 39.86% of the weight. The overall profitability of tourist attractions is a key indicator to measure performance, so the weight of the overall profitability indicator is the highest. The

second important indicator is coordinated development capability(D), which accounts for 25.77% of the weight. The coordination and cooperation between tourist attractions and other tourism enterprises (such as travel agencies) are often ignored. A good coordination and cooperation between tourist attractions and enterprises will bring more tourists. This is a win-win situation, so this indicator is the second important indicator. The third important indicator is competitiveness(C), accounting for 19.44% of the weight. The performance of a tourist attraction is also related to its competitiveness. It depends on whether the tourist attraction can attract more tourists among the many tourist attraction. The last important indicator is the overall service level (B), which accounts for 14.93% of the weight. The overall service level of tourist attractions is helpful in improving performance, but compared to other indicators, this indicator is less critical in improving tourist attraction performance.

Among the four sub-indicators under the Overall profitability(A), there is no significant difference in the weight of Return on Tourism Investment (ROI) (A4), Tourism profit growth rate (A3), and Return on Assets (ROA) (A1). These indicators reflect the overall profitability of tourist attractions. Compared to the other three sub-indicators, the Tourism income growth rate (A2) only accounts for 5.96% of the weight. This indicator reflects the growth rate of income in different periods of the tourist attraction, and cannot directly reflect the overall profitability of the tourist attractions.

Among the four sub-indicators under Overall service level(B), tourist satisfaction (B1) accounts for 8.08% of the weight, significantly higher than the other three sub-indicators. Tourist satisfaction can broadly reflect the overall service level of the tourist attraction. The weights of Tourism compliance rate (B2), Providing service ratio on time (B3), and Service flexibility (B4) are 1.93%, 2.52%, and 2.40%, respectively. There is no apparent difference in the weights of these three indicators, which can reflect the overall service level of tourist attraction to some extent. However, they are not as high priority as Tourist Satisfaction (B1).

Among the two sub-indicators under Competitiveness (C), Market share (C1) accounts for 10.61% of the weight, and Tourism growth rate (C2) accounts for 8.83% of the weight. The weight of Market share is 1.78% higher than the weight of Tourist growth rate. This shows that these two sub-indicators can well reflect the

competitiveness of tourist attractions. In comparison, the priority of Market share reflecting the competitiveness of tourist attraction is slightly higher than that of Tourism growth rate.

Among the three sub-indicators under Coordinated development capability (D), the weights of Distortion rate of information transmission (D2) and Coordinated decision-making ability (D3) are 4.30% and 5.28%, respectively. Cooperation trust (D1) accounts for 16.19% of the weight, significantly higher than the weight of Distortion rate of information transmission (D2) and Coordinated decision-making ability (D3). This shows that the cooperation trust between tourist attractions and other tourism enterprises is crucial. A high degree of cooperation trust between enterprises can improve their ability to coordinate development, improving tourism enterprises' performance.

The above data analysis results from combining the weights of three academic and three tourism organization experts. Next, the results of the lecturer group are compared and analyzed with those of the working professional group. Table 19 shows the weight of each indicator for the lecturer group and working professional group. The calculation process is shown in Appendix 3.

Table 19 Weight of each indicator for lecturer group and working professional group

Indicators	weight of lecturer group(%)	weight of working professional group(%)
Overall profitability(A)	29.24	47.84
Overall service level(B)	15.52	12.63
Competitiveness(C)	12.93	25.71
Coordinated development capability(D)	42.31	13.82
Return on Assets (A1)	4.29	20.26
Tourism income growth rate(A2)	4.82	5.85
Tourism profit growth rate(A3)	9.19	10.86
Return on Tourism Investment(A4)	10.94	10.86

Indicators	weight of lecturer group(%)	weight of working professional group(%)
Tourist satisfaction(B1)	7.58	7.27
Tourist complaint rate(B2)	3.3	0.96
Providing service ratio on time(B3)	2.34	2.29
Service flexibility(B4)	2.3	2.12
Market share(C1)	7.64	12.86
Tourist growth rate(C2)	5.3	12.86
Cooperation trust(D1)	24.74	9.23
Distortion rate of information transmission (D2)	8.47	1.91
Coordinated decision-making ability(D3)	9.09	2.67

From the above table, it can be seen that among the four indicators, the working professional group believes that Overall profitability(A) is the most important, with a weight of 47.84%; The lecturer group believes that Coordinated development capability(D) is the most important, with a weight of 42.31%. The working professional group has gained experience in practical work and believes that if tourist attractions managers want to improve performance, Overall profitability(A) is the first priority. The lecturer group found in the academic research that tourist attractions managers must pay more attention to Coordinated development capability(D) if they want to improve their performance for sustainable development.

Among the four sub-indicators under the Overall profitability(A), the lecturer group believes that Return on Tourism Investment(A4) is the most important and the priority is the first. In contrast, the working professional group believes that Return on Assets (A1) is the most important. To improve the Overall profitability(A) of the tourist attractions, the two groups of experts have different concerns.

Among the four sub-indicators under Overall service level(B), both the lecturer group and the working professional group think Tourist satisfaction(B1) is the most important, and they think that Tourist satisfaction(B1) should be the first concern to improve the Overall service level(B) of tourist attraction.

Among the two sub-indicators under Competitiveness (C), the working professional group believes that Market share(C1) and Tourist growth rate(C2) are equally important. In contrast, the lecturer group believes that Market share(C1) is more critical than Tourist growth rate(C2).

Among the three sub-indicators under Coordinated development capability (D), both the lecturer group and the working professional group believe that Cooperation trust(D1) has the highest priority and Distortion rate of information transmission (D2) has the lowest priority. That is to say, tourist attractions managers want to improve Coordinated development capability(D), and the two groups of experts have the same opinion.

From the above analysis, it can be seen that the lecturer group and the work expert group share the same viewpoint on the importance of indicators but also have different viewpoints. In order to make the weights of the indicators more representative, the author combined the weights of two groups of experts, which means that the weights of the indicators used in this article are a combination of theory and practice, reflecting the priority of the indicators more comprehensively. The weights of each indicator used in this article are shown in Table 6.

Performance measurement tool

Based on the weight of performance indicators calculated using the AHP model, this research proposes an measurement tool, as shown in Figure 5. This measurement tool helps tourist attractions to evaluate their performance, so that managers can identify which aspects of the tourist attraction need to improve their performance.

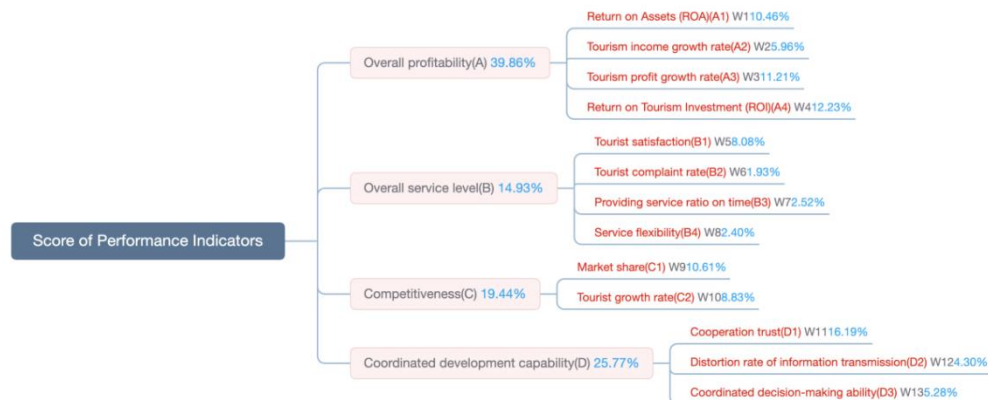


Figure 5 The performance measurement tool of tourist attraction

This research uses the Simple Additive Weighting (SAW) method to calculate the total performance score of tourist attraction. The evaluation tool proposed in this research uses real data as the indicator for ease of calculation. The different dimensions of different indicators can lead to the inability to compare and calculate. It means that due to the significant difference in real data (for example, the real data of indicator A1 is generally lower than 5%, while the real data of indicator B1 is generally higher than 60%, the real data of different indicators are pretty different), the real data of each indicator of different tourist attraction should be normalized when processing data. Moreover, the indicators proposed in this research include cost-type indicators and benefit-type indicators. Tourism compliance rate (B2) and Distortion rate of information transmission (D2) are cost-type indicators; the higher their values, the lower their scores. Other indicators are benefit-type indicators; the higher the value, the higher the score. Therefore, SAW method can effectively handle the normalization of these two types of indicators. It is convenient for tourist attractions to quickly calculate their performance scores and compare them with other tourist attractions.

SAW refers to multiplying the normalized value of the indicators for the alternatives with the importance of the indicators. The alternative with the highest score is selected as the preferred one. The total score is calculated as :

$$S_i = \sum_{j=1}^M w_j r_{ij} \quad \text{for } i=1,2,\dots,N$$

for $j=1,2,\dots,M$

N is the number of alternatives

M is the number of indicators

Where, S_i is the total score of the i th alternative;

r_{ij} is the normalized rating of the i th alternative for the j th indicator

Which is computed as

$$r_{ij} = \frac{X_{ij}}{\max_i x_{ij}} \text{ for the benefit indicators}$$

$$r_{ij} = \frac{1/X_{ij}}{\max_i (1/x_{ij})} \text{ for the cost indicators;}$$

x_{ij} represents the original value of the j th indicator of the i th alternative;

w_j is the importance (weight) of the j th indicator.

For the measurement tool proposed in this research, W is the indicator's weight. X is the real data of the indicator. The real data needs to be obtained by querying the relevant website or interviewing the person in charge of tourist attractions. R is the normalized rating of the tourist attraction for the indicators. S is the total score of the tourist attraction.

W_1 is the weight of the A1 indicator, X_1 is the real data of the A1 indicator of tourist attraction, R_1 is the normalized rating of the real data X_1 . S_1 is the score of A1 indicator, and it is the weight of the A1 indicator of tourist attraction multiplied by the normalized rating of the real data ($W_1 \times R_1 = S_1$). Similarly, $W_2, W_3, W_4, W_5, W_6, W_7, W_8, W_9, W_{10}, W_{11}, W_{12}$, and W_{13} are the weights of A2, A3, A4, B1, B2, B3, B4, C1, C2, D1, D2, and D3 indicators, respectively. $R_2, R_3, R_4, R_5, R_6, R_7, R_8, R_9, R_{10}, R_{11}, R_{12}$, and R_{13} are the normalized rating of the real data of the corresponding indicators. $S_2, S_3, S_4, S_5, S_6, S_7, S_8, S_9, S_{10}, S_{11}, S_{12}$, and S_{13} are the scores of the corresponding indicators.

According to the SAW method, tourist attractions managers first normalize real data of each indicator, then multiply the weight of each indicator by the normalized rating of the real data of each indicator, and finally add the scores of each indicator to get the total score of tourist attraction.

The total score : $S=S_1+S_2+S_3+S_4+S_5+S_6+S_7+S_8+S_9+S_{10}+S_{11}+S_{12}+S_{13}$

The total score represents the total performance score of tourist attraction. By comparing the total scores of different tourist attractions, it can reflect which tourist attractions have higher performance and which tourist attractions have lower performance (tourist attractions with higher total scores have higher performance and tourist attractions with lower total scores have lower performance). tourist attractions with lower total scores want to improve their performance. They can learn from tourist attractions with higher total scores. To learn from which aspects, they can specifically analyze which sub-indicators of the two tourist attractions have significant differences in scores and then propose effective measures to improve the sub-indicator scores.

This research selects two tourist attractions in China to evaluate their performance using the measurement tool proposed. According to the Classification and Assessment of Quality Levels of tourist attractions in China (See Appendix 2 for details), the quality level of tourist attractions are divided into five levels, from high to low, namely, AAAAA, AAAA, AAA, AA, A tourist attractions. The division and evaluation of the five levels of tourist attractions are mainly based on three standards. The evaluation criteria for the quality level of tourist attractions in China are shown in Table 20.

Table 20 Evaluation criteria for the quality level of tourist attractions in China

Chinese Standards	Rules for Grading Service Quality and Environmental Quality	Landscape Quality Scoring Rules	Detailed Rules for Rating Tourist Opinions
Criteria	1.Tourism traffic 2.Tour 3.Tourism safety 4.Hygiene 5.Posts and telecommunications 6.Tourism shopping 7.Comprehensive management 8.Resources and environmental protection	1.Resource attractiveness 2.Market influence	1.Comprehensive satisfaction of tourists

As can be seen from the table above, according to the Rules for Grading Service Quality and Environmental Quality, tourist attractions are evaluated in terms of eight criteria of tourism traffic, tour, tourism safety, hygiene, posts and telecommunications, tourism shopping, comprehensive management, resources and environmental protection; based on the Landscape Quality Scoring Rules, tourist attractions are evaluated in terms of two criteria of resource attractiveness and market influence; according to the Detailed Rules for Rating Tourist Opinions, tourist attractions are evaluated in terms of the comprehensive satisfaction of tourists. In summary, tourist attractions are evaluated from 11 criteria by the tourist attractions quality rating committee according to the above three rules, and the rating is set according to the score. After the tourist attractions meets the relevant standards, it will be recognized by the tourist attractions quality rating committee of the corresponding level, and issued with certificates and signs by the corresponding rating agency, which will become a tourist attractions of the corresponding level.

The evaluation criteria of China's tourist attractions have similarities and differences with the tools proposed in this research. Both have market influence, tourist satisfaction, tourist attractions coordination management ability, which shows that the performance tool in this research have certain reference value. The evaluation criteria of China's tourist attractions also include tourism transportation, tourism shopping, resources, and environmental protection, which covers a broader range. However, China's evaluation criteria ignore the overall profitability of tourist attractions, and the tool proposed in this study take into account the overall profitability of tourist attractions. The importance of each evaluation standard of China's tourist attractions is the same, and the tool proposed in this study gives weight to each indicator. Different weights of indicators mean different importance and priorities of indicators. High-weighted indicators indicate high priority, while low-weighted indicators indicate low priority. If the person in charge of a tourist attractions wants to improve the performance of the tourist attractions, he should focus on the indicators with high priority. Only by accurately finding measures to improve the performance of tourist attractions can we achieve the goal with half the effort. The tool proposed in this study helps tourist attractions solve this problem.

This research chooses two different levels (e.g., AAAAA-level and AAA-level) tourist attractions in China to calculate their performance. The performance results are compared with the level of two tourist attractions to verify the measurement tool. The level of high performance sightseeing place is higher than that of low performance sightseeing place.



CHAPTER IV

A CASE STUDY OF SIGHTSEEING PLACES

This chapter aims to calculate the performance of two sightseeing places, and then the performance results will be compared with the level of the two places to verify the measurement tool.

In this research, two sightseeing places in China, Yellow Crane Tower and Qingchuan Pavilion, are selected as case studies. Both of which are located in Wuhan, China. These two places are the top three famous sightseeing places in Wuhan. Ancient poets have written very famous poems for these two sightseeing places, so they are well-known.

Yellow Crane Tower is an AAAAA sightseeing place in China, while Qingchuan Pavilion is a AAA sightseeing place. The quality level of sightseeing places in China is divided into five levels from high to low, followed by AAAAA, AAAA, AAA, AA, and A-level. The quality levels of China's tourist attractions is uniformly assessed by the national tourist attractions quality rating agencies. The evaluation of the quality level of tourist attractions is mainly conducted from the perspectives of tourism transportation, tourism safety, postal and telecommunications services, tourism shopping, business management, resource and environmental protection, tourism resource attractiveness, market attractiveness, annual tourist reception, and satisfaction rate of tourist sampling surveys. Different levels have different requirements, such as the number of tourists received annually, and the AAAAA tourist attractions requires more than 600000 domestic and foreign tourists received annually; AAAA tourist attractions are required to receive more than 500000 domestic and foreign tourists annually; AAA tourist attractions to A tourist attractions are required to receive more than 300000, 100000 and 30000 domestic and foreign tourists annually. All qualified tourist attractions will be announced to the public by the national tourist attractions quality rating agencies. The Classification and Assessment of Quality Levels of tourist attractions in China is displayed in appendix 2. The quality level evaluation of tourist attractions has strict standards. The evaluation

results are authoritative. Thus, compared with the quality level of tourist attractions, the validity of the measurement tool can be confirmed.

Performance of Yellow Crane Tower

Yellow Crane Tower is located on the top of Snake Mountain, with five floors and a height of over 50 meters. It has 72 columns rising from the ground and 60 raised corners stretching out in the air, just like the yellow crane soaring. There are large-scale murals, cultural relics, etc., arranged on each building floor. Many auxiliary buildings, such as bronze and yellow crane-shaped buildings, Shengxiang pagoda, memorial archways, and pavilions, are cast outside the building. The floor is covered with over 100000 yellow-glazed tiles, and the colors are brilliant against the backdrop of blue sky and white clouds. The picture of the Yellow Crane Tower is shown in Figure 6.



Figure 6 The picture of the Yellow Crane Tower

The original data collected from Yellow Crane Tower, Qingchuan Pavilion and tourist attractions Management Committee are shown in the following table 21.

Table 21 The original data of Yellow Crane Tower and Qingchuan Pavilion

Indicators	Data of Yellow Crane	Data of Qingchuan
	Tower(%)	Pavilion(%)
Return on Assets (A1)	1.23	0.85
Tourism income growth rate(A2)	4.3	3.8
Tourism profit growth rate(A3)	2.75	1.3
Return on Tourism Investment(A4)	4.85	3.67
Tourist satisfaction(B1)	75	80
Tourist complaint rate(B2)	5	2
Providing service ratio on time(B3)	83	85
Service flexibility(B4)	16	11
Market share(C1)	3.67	2.18
Tourist growth rate(C2)	4.5	2
Cooperation trust(D1)	60	60
Distortion rate of information transmission (D2)	2	3
Coordinated decision-making ability(D3)	80	75

The steps to calculate the total performance score of Yellow Crane Tower using Simple Additive Weighting (SAW) method are as follows.

Step 1 : Normalized data for Yellow Crane Tower.

Simple Additive Weighting method is simple and easy to understand. It is convenient for tourist attractions to quickly calculate their performance scores and compare them with other tourist attractions. Furthermore, Simple Additive Weighting can handle both cost-type and benefit-type data. For example, Tourist satisfaction (B1) normalizes the data based on benefits, with higher values leading to higher scores; The tourist complaint rate (B2) and Distortion rate of information transmission (D2) normalize the data based on cost, with smaller values leading to higher scores.

For the benefit sub-indicators:

Normalize Data of Yellow Crane Tower=Data of Yellow Crane Tower/Max Data between Yellow Crane Tower and Qingchuan Pavilion.

For example, Normalize Data of Return on Assets (A1)=1.23/1.23=1

For the cost sub-indicators:

Normalize Data of Yellow Crane Tower=(1/Data of Yellow Crane Tower)/(1/Min Data between Yellow Crane Tower and Qingchuan Pavilion).

For example, Normalize Data of Tourist complaint rate(B2)=(1/5)/(1/2)=0.4

The following are the normalized data for each sub-indicator of Yellow Crane Tower.

Table 22 The normalized data for sub- indicator(A1-A4) of Yellow Crane Tower

Indicators	Data of Yellow Crane Tower(%)	Data of Qingchuan Pavilion(%)	Normalize Data of Yellow Crane Tower
Return on Assets (A1)	1.23	0.85	1
Tourism income growth rate(A2)	4.3	3.8	1
Tourism profit growth rate(A3)	2.75	1.3	1
Return on Tourism Investment(A4)	4.85	3.67	1

Table 23 The normalized data for sub-indicator(B1-B4) of Yellow Crane Tower

Indicators	Data of Yellow Crane Tower(%)	Data of Qingchuan Pavilion(%)	Normalize Data of Yellow Crane Tower
Tourist satisfaction(B1)	75	80	0.9375
Tourist complaint rate(B2)	5	2	0.4
Providing service ratio on time(B3)	83	85	0.976470588
Service flexibility(B4)	16	11	1

Table 24 The normalized data for sub-indicator(C1-C2) of Yellow Crane Tower

Indicators	Data of Yellow Crane	Data of Qingchuan	Normalize Data of Yellow
	Tower(%)	Pavilion(%)	Crane Tower
Market share(C1)	3.67	2.18	1
Tourist growth rate(C2)	4.5	2	1

Table 25 The normalized data for sub-indicator(D1-D3) of Yellow Crane Tower

Indicators	Data of Yellow	Data of Qingchuan	Normalize Data of Yellow
	Crane Tower(%)	Pavilion(%)	Crane Tower
Cooperation trust(D1)	60	60	1
Distortion rate of information transmission (D2)	2	3	1
Coordinated decision-making ability(D3)	80	75	1

Step 2: Calculate the score for each sub-indicator of Yellow Crane Tower

Score of Yellow Crane Tower = Weights × Normalize Data of Yellow Crane Tower

For example, Score of Return on Assets (A1)=10.46%*1=10.46%

The scores for each sub-indicator of Yellow Crane Tower are as follows.

Table 26 The score for sub-indicator(A1-A4) of Yellow Crane Tower

Indicators	Weights(%)	Normalize Data of Yellow Crane Tower	Score of Yellow Crane Tower(%)
Return on Assets (A1)	10.46	1	10.46
Tourism income growth rate(A2)	5.96	1	5.96
Tourism profit growth rate(A3)	11.21	1	11.21
Return on Tourism Investment(A4)	12.23	1	12.23

Table 27 The score for sub-indicator(B1-B4) of Yellow Crane Tower

Indicators	Weights(%)	Normalize Data of Yellow Crane Tower	Score of Yellow Crane Tower(%)
Tourist satisfaction(B1)	8.08	0.9375	7.575
Tourist complaint rate(B2)	1.93	0.4	0.772
Providing service ratio on time(B3)	2.52	0.976470588	2.460705882
Service flexibility(B4)	2.4	1	2.4

Table 28 The score for sub-indicator(C1-C2) of Yellow Crane Tower

Indicators	Weights(%)	Normalize Data of Yellow Crane Tower	Score of Yellow Crane Tower(%)
Market share(C1)	10.61	1	10.61
Tourist growth rate(C2)	8.83	1	8.83

Table 29 The score for sub-indicator(D1-D3) of Yellow Crane Tower

Indicators	Weights(%)	Normalize Data of Yellow Crane Tower	Score of Yellow Crane Tower(%)
Cooperation trust(D1)	16.19	1	16.19
Distortion rate of information transmission (D2)	4.3	1	4.3
Coordinated decision-making ability(D3)	5.28	1	5.28

Step 3: Calculate the total score of Yellow Crane Tower

The total score is equal to the sum of each indicator score.

The total score(%)

$$=10.46+5.96+11.21+12.23+7.58+0.77+2.46+2.4+10.61+8.83+16.19+4.3+5.28=98.28$$

Performance of Qingchuan Pavilion

Qingchuan Pavilion covers a total area of 386 square meters, with a reinforced concrete imitation wood structure and a height of 17.5 meters. The doors and windows are made of glass and metal components, and traditional techniques are used for color painting and carving. The entire Qingchuan Pavilion is divided into two floors, fully reflecting the magnificent style of the Chu people's "building platforms and pavilions based on the mountains". It is rich in an intense atmosphere of Chu culture. The picture of the Qingchuan Pavilion is shown in Figure 7.



Figure 7 The picture of the Qingchuan Pavilion

According to the original data collected from the Yellow Crane Tower, Qingchuan Pavilion and tourist attractions Management Committee, the steps to calculate the total performance score of Qingchuan Pavilion using Simple Additive Weighting (SAW) method are as follows.

Step1 : Normalized data for Qingchuan Pavilion.

For the benefit sub-indicators:

Normalize Data of Qingchuan Pavilion=Data of Qingchuan Pavilion/Max Data between Yellow Crane Tower and Qingchuan Pavilion

For example, Normalize Data of Return on Assets (A1)=0.85/1.23=0.691056911

For the cost sub-indicators:

Normalize Data of Qingchuan Pavilion=(1/Data of Qingchuan Pavilion)/(1/Min Data between Yellow Crane Tower and Qingchuan Pavilion)

For example, Normalize Data of Tourist complaint rate(B2)=(1/2)/(1/2)=1

The following are the normalized data for each sub-indicator of Qingchuan Pavilion.

Table 30 The normalized data for sub-indicator(A1-A4) of Qingchuan Pavilion

Indicators	Data of Yellow Crane	Data of Qingchuan	Normalize Data of Qingchuan Pavilion
	Tower(%)	Pavilion(%)	
Return on Assets (A1)	1.23	0.85	0.691056911
Tourism income growth rate(A2)	4.3	3.8	0.88372093
Tourism profit growth rate(A3)	2.75	1.3	0.472727273
Return on Tourism Investment(A4)	4.85	3.67	0.756701031

Table 31 The normalized data for sub-indicator(B1-B4) of Qingchuan Pavilion

Indicators	Data of Yellow Crane	Data of Qingchuan	Normalize Data of Qingchuan Pavilion
	Tower(%)	Pavilion(%)	
Tourist satisfaction(B1)	75	80	1
Tourist complaint rate(B2)	5	2	1
Providing service ratio on time(B3)	83	85	1
Service flexibility(B4)	16	11	0.6875

Table 32 The normalized data for sub-indicator(C1-C2) of Qingchuan Pavilion

Indicators	Data of Yellow Crane	Data of Qingchuan	Normalize Data of Qingchuan Pavilion
	Tower(%)	Pavilion(%)	
Market share(C1)	3.67	2.18	0.59400545
Tourist growth rate(C2)	4.5	2	0.444444444

Table 33 The normalized data for sub-indicator(D1-D3) of Qingchuan Pavilion

Indicators	Data of Yellow Crane Tower(%)	Data of Qingchuan Pavilion(%)	Normalize Data of Qingchuan Pavilion
Cooperation trust(D1)	60	60	1
Distortion rate of information transmission (D2)	2	3	0.666666667
Coordinated decision-making ability(D3)	80	75	0.9375

Step 2: Calculate the score for each sub-indicator of Qingchuan Pavilion

Score of Qingchuan Pavilion = Weights \times Normalize Data of Qingchuan Pavilion

For example, Score of Return on Assets (A1)=10.46%*0.691056911=7.228455285%

The scores for each sub-indicator of Qingchuan Pavilion are as follows.

Table 34 The score for sub-indicator(A1-A4) of Qingchuan Pavilion

Indicators	Weights(%)	Normalize Data of Qingchuan Pavilion	Score of Qingchuan Pavilion(%)
Return on Assets (A1)	10.46	0.691056911	7.228455285
Tourism income growth rate(A2)	5.96	0.88372093	5.266976744
Tourism profit growth rate(A3)	11.21	0.472727273	5.299272727
Return on Tourism Investment(A4)	12.23	0.756701031	9.254453608

Table 35 The score for sub-indicator(B1-B4) of Qingchuan Pavilion

Indicators	Weights(%)	Normalize Data of Qingchuan Pavilion	Score of Qingchuan Pavilion(%)
Tourist satisfaction(B1)	8.08	1	8.08
Tourist complaint rate(B2)	1.93	1	1.93
Providing service ratio on time(B3)	2.52	1	2.52
Service flexibility(B4)	2.4	0.6875	1.65

Table 36 The score for sub-indicator(C1-C2) of Qingchuan Pavilion

Indicators	Weights(%)	Normalize Data of Qingchuan Pavilion	Score of Qingchuan Pavilion(%)
Market share(C1)	10.61	0.59400545	6.30239782
Tourist growth rate(C2)	8.83	0.444444444	3.924444444

Table 37 The score for sub-indicator(D1-D3) of Qingchuan Pavilion

Indicators	Weights(%)	Normalize Data of Qingchuan Pavilion	Score of Qingchuan Pavilion(%)
Cooperation trust(D1)	16.19	1	16.19
Distortion rate of information transmission (D2)	4.3	0.666666667	2.866666667
Coordinated decision-making ability(D3)	5.28	0.9375	4.95

Step 3: Calculate the total score of Qingchuan Pavilion

The total score is equal to the sum of each indicator score.

The total score(%)

$$=7.23+5.27+5.3+9.25+8.08+1.93+2.52+1.65+6.3+3.92+16.19+2.87+4.95=75.46$$

Results

The following table shows the scores of each sub-indicator and the total performance scores of Yellow Crane Tower and Qingchuan Pavilion.

Table 38 The score of each sub-indicator and total performance scores

Indicators	Weights(%)	Score of Yellow Crane Tower(%)	Score of Qingchuan Pavilion(%)
Return on Assets (A1)	10.46	10.46	7.23
Tourism income growth rate(A2)	5.96	5.96	5.27
Tourism profit growth rate(A3)	11.21	11.21	5.3
Return on Tourism Investment(A4)	12.23	12.23	9.25
Tourist satisfaction(B1)	8.08	7.58	8.08
Tourist complaint rate(B2)	1.93	0.77	1.93
Providing service ratio on time(B3)	2.52	2.46	2.52
Service flexibility(B4)	2.4	2.4	1.65
Market share(C1)	10.61	10.61	6.3
Tourist growth rate(C2)	8.83	8.83	3.92
Cooperation trust(D1)	16.19	16.19	16.19
Distortion rate of information transmission (D2)	4.3	4.3	2.87
Coordinated decision-making ability(D3)	5.28	5.28	4.95
Total Score(%)		98.28	75.46

In summary, the total score of Yellow Crane Tower is 98.27, and the total score of Qingchuan Pavilion is 75.46. The score of Yellow Crane Tower is higher than that of Qingchuan Pavilion. The higher the score, the better its performance. Therefore, Yellow Crane Tower's performance is better than Qingchuan Pavilion's. Furthermore, Yellow Crane Tower's quality level is higher than Qingchuan Pavilion's. The performance results are consistent with the Yellow Crane Tower (AAAAA) and Qingchuan Pavilion (AAA) level. Therefore, it proves that the performance evaluation tool proposed in this research is feasible. Tourist attractions can use this evaluation

tool to calculate performance and compare it with other tourist attractions. According to the performance indicators of tourist attractions, analyze the reasons for low performance, and propose measures to improve the performance of tourist attractions.

The scores of Tourist satisfaction(B1), Tourist complaint rate(B2), and Providing service ratio on time(B3) in Qingchuan Pavilion are higher than those of Yellow Crane Tower. However, due to the low weight of these three indicators, the overall performance score of Yellow Crane Tower is still higher than that of Qingchuan Pavilion. To improve overall performance, Qingchuan Pavilion should not only consider B1, B2, and B3 but should focus more on Tourism profit growth rate(A3). Because Tourism profit growth rate(A3) accounts for 11.21% of the weight, the score of Qingchuan Pavilion Tourism profit growth rate(A3) is half that of Yellow Crane Tower.

Here are some suggestions for Qingchuan Pavilion to improve Tourism profit growth rate(A3) performance.

1. Cooperate with major online media to create online celebrity attractions. Qingchuan Pavilion is one of the three significant sightseeing places in Wuhan. However, many outsiders are not aware of this sightseeing place, so it can be promoted through the currently developed online media to expand its popularity. More people know about Qingchuan Pavilion, and more people will visit it, bringing income to tourist attractions.

2. Increase ticket prices for Qingchuan Pavilion. Since Qingchuan Pavilion is sometimes free of charge, it may make tourists think it is not worth visiting. Nevertheless, Qingchuan Pavilion is a very historic sightseeing place. Cui Hao, a poet of the Tang Dynasty, once wrote a famous poem for Qingchuan Pavilion that was passed on by word of mouth. Raising the ticket price of Qingchuan Pavilion can also bring income to tourist attractions, thereby improving the profits of Qingchuan Pavilion.

3. Collaborate with well-known travel agencies. Collaborating with travel agencies can bring more tourists to Qingchuan Pavilion. When designing tourist routes, travel agencies can design more routes with Qingchuan Pavilion, bringing more tourists to tourist attractions.

4. Introduce specialty snacks. Tourists who are tired or hungry from traveling will buy water or food. Qingchuan Pavilion introduces special snacks to promote tourist consumption and increase income for tourist attractions.

Yellow Crane Tower's overall performance is higher than Qingchuan Pavilion's, but the scores of B1, B2, and B3 indicators are lower than that of Qingchuan Pavilion. To continue improving its performance, Yellow Crane Tower can refer to the relevant measures of Qingchuan Pavilion. Especially for the B2 indicator, the score of Qingchuan Pavilion is 2.5 times that of Yellow Crane Tower.

Here are some suggestions for Yellow Crane Tower to improve Tourist complaint rate(B2) performance.

1. Reduce the ticket prices for the Yellow Crane Tower. Many people come to visit the Yellow Crane Tower due to its fame. However, after visiting, it was found that the ticket price of 80 yuan per person in Yellow Crane Tower was not worth it. Due to not meeting the psychological expectations of tourists, the complaint rate of Yellow Crane Tower is relatively high. Reducing the ticket prices of Yellow Crane Tower can lower tourists' psychological expectations and reduce the complaint rate.

2. Improve the explanation service. Tourists come to visit the Yellow Crane Tower, but they do not understand its historical meaning and its architectural structure. Tourist attractions managers can arrange professionals to explain the story of the Yellow Crane Tower interestingly.

3. Build more service facilities. Due to the large area of the Yellow Crane Tower, tourists who want to go to the restroom or buy water and food must walk a long distance when playing. This leads to complaints among tourists who cannot be quickly satisfied when they need these basic service facilities. Thus, the Yellow Crane Tower should be designed with more service facilities.

CHAPTER V

CONCLUSION AND FUTURE RESEARCH DIRECTION

This chapter is mainly divided into three parts: conclusion, future research directions, and limitations.

Conclusion

As indicated in Chapter 1, there are three objectives for this thesis. Firstly, to identify performance evaluation indicators of the tourist attractions. Secondly, to weigh the importance of the performance evaluation indicators. Thirdly, to develop a performance measurement tool for the tourist attractions.

1. To identify performance evaluation indicators of the tourist attractions.

In order to study the performance evaluation indicators of tourist attractions, this research first conducts a systematic literature review of the performance indicators. From a large number of literature reviews, four indicators were selected: Overall profitability, Overall service level, Competitiveness, and Coordinated development capability. Then through repeated research on relevant literature, the author selected 13 sub-indicators based on the number of selected literature for each sub-indicator. Overall profitability includes four sub-indicators: Return on Assets (ROA), Tourism income growth rate, Tourism profit growth rate, and Return on Tourism Investment. Overall service level includes four sub-indicators, namely Tourist satisfaction, Tourist complaint rate, Providing service ratio on time and Service flexibility. Competitiveness includes two sub-indicators: Market share and Tourist growth rate. Coordinated development capability includes three sub-indicators: Cooperation trust, Distortion rate of information transmission, and Coordinated decision-making ability.

2. To weigh the importance of the performance evaluation indicators.

This study selects 4 indicators and 13 sub-indicators as the performance indicators of tourist attractions and then uses the AHP model to calculate the priority of the 4 indicators and 13 sub-indicators. The author constructs a paired comparative

survey questionnaire based on the AHP model for indicators. The author invited many relevant scholars and tourism practitioners to fill out the survey questionnaire and ultimately received responses from three scholars and three tourism practitioners. Based on the responses to the questionnaire, the author used the AHP method to calculate the paired comparison matrix of indicators using Excel, obtained the weights of each indicator, and tested consistency. Due to receiving 6 survey questionnaires, the author calculated 6 weights for each indicator. The author used the geometric mean of the 6 weights of the indicator and normalized them to obtain the final weights. The weights of the four indicators, Overall profitability, Overall service level, Competitiveness, and Coordinated development capability, are 39.86%, 14.93%, 19.44%, and 25.77%, respectively. Return on Assets (ROA), Tourism income growth rate, Tourism profit growth rate, Return on Tourism Investment, Tourism satisfaction, Tourism compliance rate, Providing service rate on time, Service flexibility, Market share, Tourism growth rate, Cooperation trust, Distortion rate of information transmission and Coordinated decision making ability, the weights of these 13 sub-indicators are 10.46%, 5.96%, 11.21%, 12.23%, 8.08%, 1.93%, 2.52%, 2.40%, 10.61%, 8.83%, 16.19%, 4.30%, and 5.28%, respectively.

3. To develop a performance measurement tool for the tourist attractions.

According to the performance indicators and indicator weights of tourist attractions established by AHP model, this research proposes a performance evaluation tool. This research selects two tourist attractions in China (one is 5A tourist attraction, and the other is 3A tourist attraction), and collects the real data of 13 sub-indicators of these two tourist attractions. The Simple Additive Weighting (SAW) method is used to calculate the performance of two tourist attractions. This method can normalize both benefit and cost data. Then multiply the weight of indicators by the normalized data to get the score of each indicator, and finally, add the scores of each indicator to get the total score of tourist attractions. The total scores of the two tourist attractions are compared with a standard performance measurement tool of China, that is China's tourist attractions rating system. Tourist attractions with higher total scores have higher level, and tourist attractions with lower total scores have lower level. Because the classification and evaluation of the level of China's tourist

attractions have stringent implementation standards, which are proposed by the national tourism attraction quality rating agencies, a Chinese authority.

In this study, the total score of Yellow Crane Tower (5A tourist attraction) is higher than that of Qingchuan Pavilion (3A tourist attraction) through calculation. Therefore, the evaluation tool proposed in this article is feasible. Based on the case analysis, some specific measures are proposed to improve the performance of Yellow Crane Tower and Qingchuan Pavilion. This measurement tool can help tourist attractions calculate their performance scores and can also be compared with the performance of other tourist attractions. Through this tool, tourist attractions managers can realize the specific reasons for different performances among tourist attractions. Tourist attractions managers can also propose specific and compelling measures to improve performance based on their performance scores.

Further Research

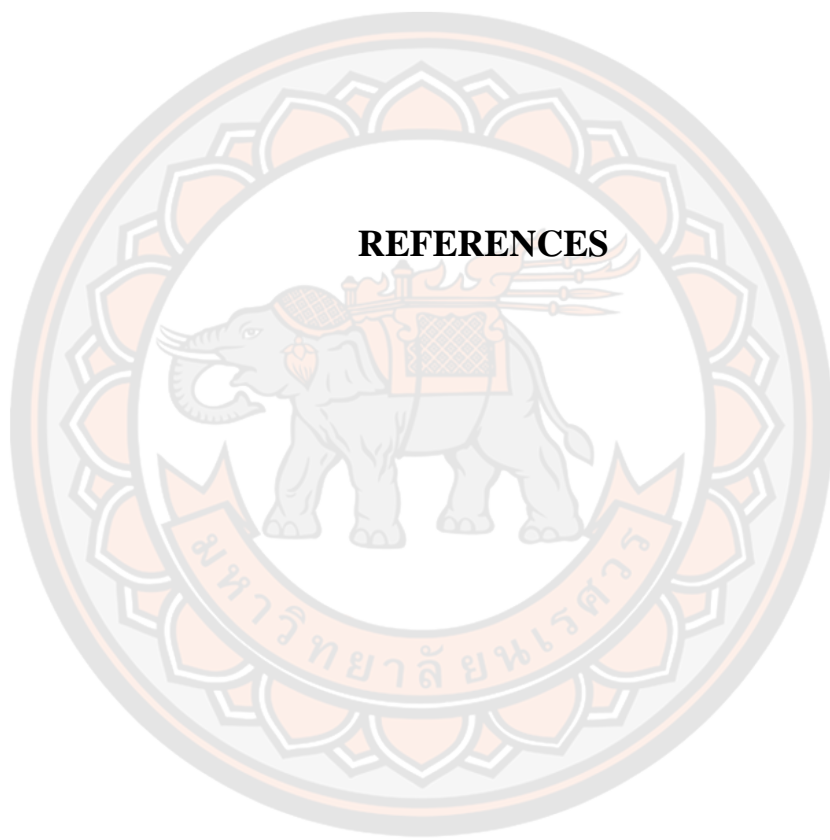
In the future, to apply with the case studies, online-measurement can be carried out through the website by using the proposed tool. Then to show the model's accuracy, the result will be compared with the touring rating system of China National Tourism Administration. Also, in further research, if there is enough data with many sightseeing places, the database might be created for the performance of sightseeing places (as a tourist attractions Rating Category in China).

Limitations

The measurement tool proposed in this research needs to rely on the real data of each indicator. If real data cannot be obtained, the measurement tool cannot work and cannot evaluate the performance of sightseeing places.

The measurement tool proposed in this research has been confirmed to be feasible by Chinese sightseeing places, and whether it is suitable for performance evaluation of foreign sightseeing places needs to be verified.

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APPENDIX

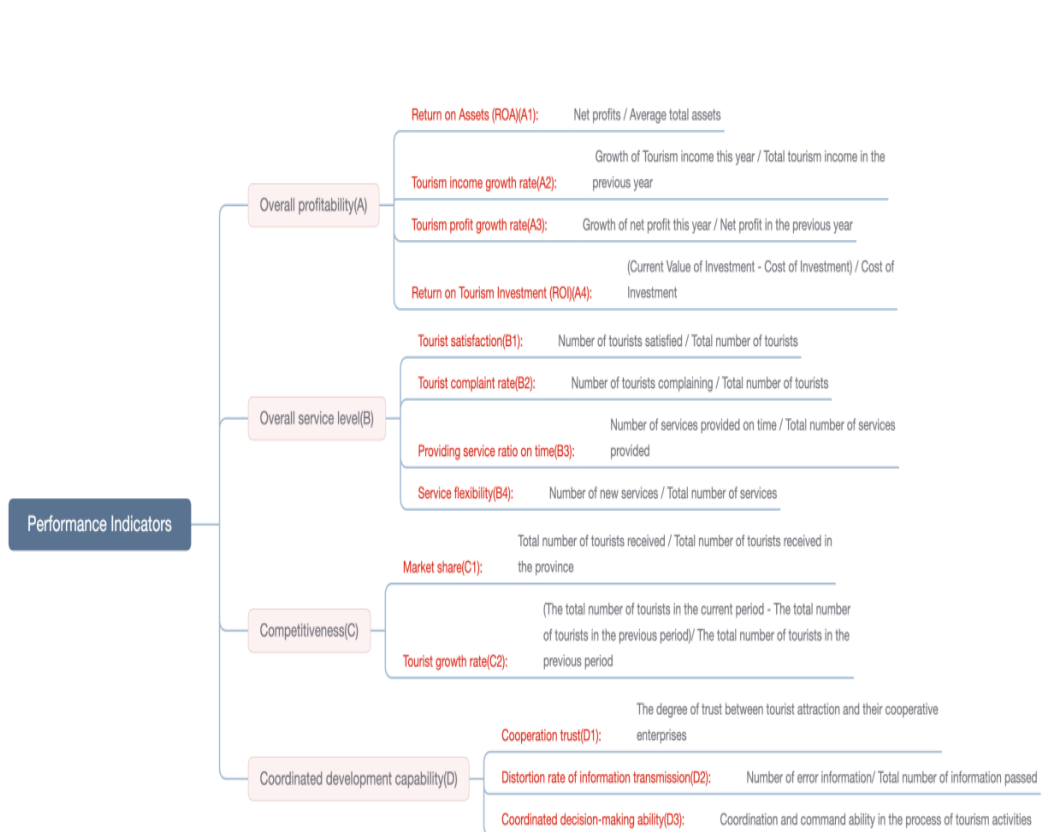
APPENDIX A AHP QUESTIONNAIRE ON PERFORMANCE INDICATORS OF TOURIST ATTRACTION

AHP Questionnaire on Performance Indicators of Tourist Attraction

The goal of the research is to develop the performance measurement tool of the tourist attraction. The research have reviewed the relevant literatures and identify indicators for measuring tourist attraction performance. The importance ranking of each indicator is obtained by using Analytic Hierarchy Process (AHP) method. The purpose of this questionnaire is to rank the importance of the performance indicators. So, this questionnaire requires you to score these indicators.

Questionnaire description:

1. Description of performance indicators. Performance indicators include 4 first-level indicators (Overall profitability, Overall service level, Competitiveness, Coordinated development capability). There are second-level indicators under the first level indicators, as shown in the figure below (The red font is the second-level indicators, after the red font is the explanation of the second-level indicators).



2. Scoring criteria. Please score the relative importance of the indicators in the table 1 to 5 according to the following.

Score	Definition
1	Equally important.
3	Slightly more important
5	More important
7	Strongly more important
9	Absolutely more important

<p>3. Scoring instructions. The table is to judge the relative importance of each indicator. Please tick P the corresponding score according to the above scoring criteria</p>	
<p>Personal Information</p> <p>Employer</p> <p>Position</p> <p>Email</p>	
<p>Importance of first-level indicators</p> <p style="text-align: center;">9 7 5 3 1 3 5 7 9</p>	
Overall profitability(A)	Overall service level(B)
Overall profitability(A)	Competitiveness(C)
Overall profitability(A)	Coordinated development capability(D)
Overall service level(B)	Competitiveness(C)
Overall service level(B)	Coordinated development capability(D)
Competitiveness(C)	Coordinated development capability(D)
<p>Importance of second-level indicators with overall profitability</p> <p style="text-align: center;">9 7 5 3 1 3 5 7 9</p>	
Return on Assets (A1)	Tourism income growth rate(A2)
Return on Assets (A1)	Tourism profit growth rate(A3)
Return on Assets (A1)	Return on Tourism Investment(A4)
Tourism income growth	Tourism profit growth

rate(A2) Tourism income growth		rate(A3) Return on Tourism
rate(A2) Tourism profit growth		Investment(A4) Return on Tourism
rate(A3)		Investment(A4)
Importance of second-level indicators with Overall service level		
	9 7 5 3 1 3 5 7 9	
Tourist satisfaction(B1)		Tourist complaint rate(B2)
Tourist satisfaction(B1)		Providing service ratio on time(B3)
Tourist satisfaction(B1)		Service flexibility(B4)
Tourist complaint rate(B2)		Providing service ratio on time(B3)
Tourist complaint rate(B2)		Service flexibility(B4)
Providing service ratio on time(B3)		Service flexibility(B4)
Importance of second-level indicators with Competitiveness		
	9 7 5 3 1 3 5 7 9	
Market share(C1)		Tourist growth rate(C2)
Importance of second-level indicators with		
	9 7 5 3 1 3 5 7 9	

**Coordinated development
capability**

Cooperation trust(D1)

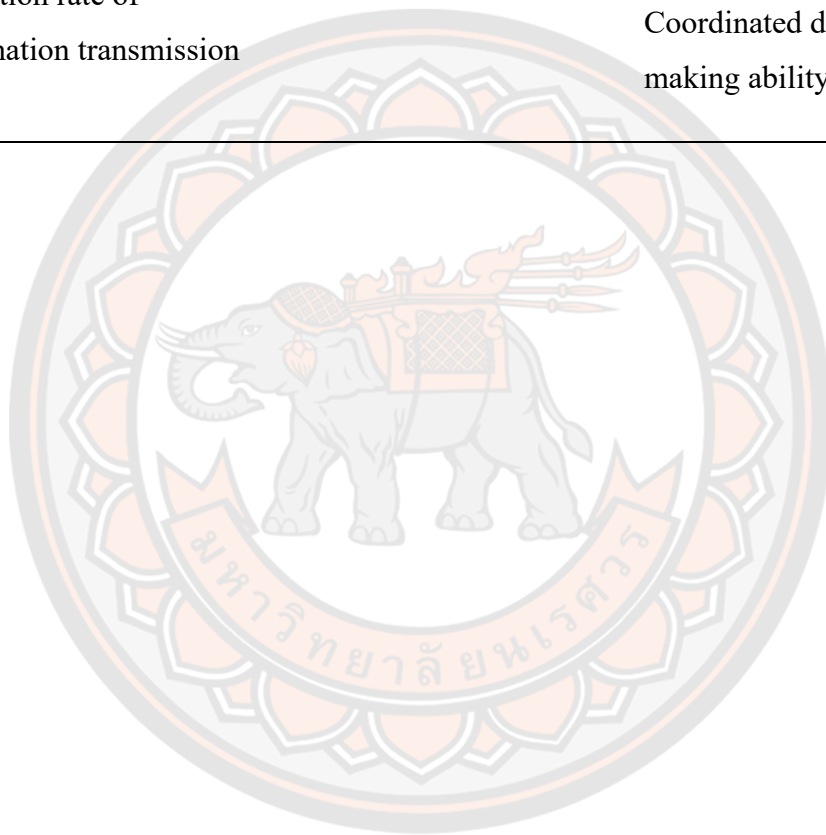
Distortion rate of
information transmission
(D2)

Cooperation trust(D1)

Coordinated decision-
making ability(D3)

Distortion rate of
information transmission
(D2)

Coordinated decision-
making ability(D3)



APPENDIX B CLASSIFICATION AND ASSESSMENT OF QUALITY LEVELS OF TOURIST ATTRACTION (GB/T17775 – 2003)

This standard is proposed by the National Tourism Administration.

This standard is under the jurisdiction and interpretation of the National Tourism Standardization Technical Committee.

The drafting unit of this standard is the Planning, Development and Finance Department of the National Tourism Administration.

1. Scope

This standard specifies the basis, conditions and basic requirements for quality grading of tourist attraction.

This standard is applicable to all types of tourist attraction that receive tourists at home and abroad, including tourist attraction that focus on natural landscape and cultural landscape.

2. Normative References

For dated reference documents, all subsequent amendments (excluding corrected content) or revisions are not applicable to this standard. However, parties to agreements based on this standard are encouraged to study whether the latest versions of these documents can be used. For undated references, the latest version applies to this standard.

3. Terms and definitions

The following terms and definitions apply to this standard.

3.1 tourist attraction

Tourist attraction are spaces or regions with tourism and related activities as the main function or one of the main functions. In this standard, tourist attraction refer to independent management areas that have the functions of visiting, leisure and vacation, recreation and fitness, and have corresponding tourism service facilities and provide corresponding tourism services. The management area should have a unified management organization and a clear geographical scope. It includes scenic spots, cultural museums, temples, tourist resorts, nature reserves, theme parks, forest parks, geological parks, amusement parks, zoos, botanical gardens and various tourist attraction such as industry, agriculture, economy and trade, science and

education, military, sports, culture and art.

3.2 Tourism Resources

Various things and factors that can attract tourists in nature and human society, can be developed and utilized for the tourism industry, and can generate economic, social, and environmental benefits.

3.3 Tourist Center

A special place set up in tourist attraction to provide tourists with tourism facilities and service functions such as information, consultation, travel arrangement, explanation, education and rest.

4. Quality levels and signs of tourist attraction

4.1 The quality level of tourist attraction is divided into five levels, from high to low, they are AAAAA, AAAA, AAA, AA, A-level tourist attraction.

4.2 The quality rating signs and certificates of tourist attraction shall be uniformly stipulated by the national tourist attraction quality rating agencies.

5. Quality level conditions of tourist attraction

5.1 AAAAA tourist attraction

5.1.1 Tourism transportation

a) Good accessibility. Complete transportation facilities and convenient access. Or it has first-class highway or high-grade channel and direct route; Alternatively, there may be a dedicated travel route for transportation.

b) There is a dedicated parking lot or ship dock that is coordinated with the landscape environment. The management is complete, the layout is reasonable, and the capacity can fully meet the requirements of tourist reception. The site is flat and solid, with beautiful greenery or unobstructed and clean water. The logo is standardized, eye-catching, and aesthetically pleasing.

c) The layout of tour routes or waterways within the area is reasonable and smooth, with a high connection to the viewing content and a strong sense of excitement. The road features are prominent, or the waterway water is clear.

d) Clean energy transportation should be used within the area.

5.1.2 Tour

a) The tourist center is located reasonably, with a moderate scale, complete facilities, and sufficient functionality. The consulting service

personnel are fully equipped, proficient in business, and enthusiastic in service.

b) Various guide signs (including panorama, guide map, signboard, scenery introduction board, etc.) have prominent modeling features, strong artistic sense and cultural atmosphere, and can set off the overall environment. The setting of signage and scenery introduction signs is reasonable.

c) Public information materials (such as research papers, popular science books, comprehensive picture albums, audio-visual products, tour guides, and tour guide materials) have prominent characteristics, complete varieties, rich content, beautiful writing, exquisite production, and timely updates.

d) The tour guide (interpreter) must hold a certificate and be able to meet the needs of tourists in terms of number and language. The Mandarin proficiency rate is 100%. Tour guides (interpreters) should have a college degree or above, with no less than 30% having a bachelor's degree or above.

e) The tour guide's (explanation) vocabulary is scientific, accurate, and literary. The tour guide service is targeted, emphasizing personalization, and the service quality meets the requirements of Chapter 4.5.3 and Chapter 5 of GB/T 15971-1995.

f) The public infographic symbols are reasonably set, beautifully designed, featured, artistic and cultural, and comply with the provisions of GB/T10001.1.

g) The layout of public rest facilities for tourists is reasonable, with sufficient quantity, exquisite design, prominent features, and an artistic and cultural atmosphere.

5.1.3 Tourism Safety

a) Seriously implement the safety regulations formulated and issued by relevant departments such as public security, transportation, labor, quality supervision, and tourism, establish a sound security system, and fully implement the work.

b) Fire protection, anti-theft, rescue and other equipment are complete, intact, and effective. Transportation, electromechanical, tourism, entertainment and other equipment are in good condition, operating normally, and without safety hazards. The amusement park meets the safety and service standards

specified in GB/T 16767. Dangerous areas have clear signs, complete and effective protective facilities, and special areas are guarded by dedicated personnel.

c) Establish an emergency rescue mechanism, establish a medical clinic, and equip full-time medical personnel. Equipped with emergency response plans, strong emergency response capabilities, timely and appropriate accident handling, and accurate and complete archive records.

5.1.4 Hygiene

a) The environment is clean and tidy, free from sewage, dirt, disorderly construction, stacking, and littering. The buildings and various facilities and equipment are free from peeling and dirt, and the air is fresh and odorless.

b) All types of venues meet the requirements of GB 9664, catering venues meet the requirements of GB 16153, and swimming venues meet the requirements of GB 9667.

c) The layout of public toilets is reasonable, the quantity can meet the needs, the signs are eye-catching and beautiful, and the architectural design is landscape oriented. All toilets are equipped with flushing, washing, and ventilation equipment, and are kept in good condition or use non flushing ecological toilets. The toilet is serviced by dedicated personnel, and the sanitary ware is clean, free from dirt and blockage. The interior is clean and has a cultural atmosphere.

d) The layout of the garbage bin is reasonable, with obvious signs, beautiful and unique appearance, and coordinated with the environment. Garbage bins are classified and set up, with timely garbage cleaning and daily cleaning.

e) Food hygiene complies with national regulations, and catering services are equipped with disinfection facilities. Disposable tableware that causes environmental pollution should not be used.

5.1.5 Postal and Telecommunications Services

a) Provide postal and postal commemorative services.

The layout of communication facilities is reasonable. Public telephones are installed at entrances, exits, and tourist centers, with international and domestic direct dial functions.

b) The public telephone booth is coordinated with the

environment, and the signs are beautiful and eye-catching.

c) Convenient communication, smooth lines, friendly service, and reasonable fees.

d) Able to receive mobile phone signals.

5.1.6 Tourism shopping

a) The layout of shopping venues is reasonable, with distinctive architectural shapes, colors, and materials that are coordinated with the environment.

b) Centralized management of shopping venues should be carried out, with a clean and orderly environment, and there should be no phenomenon of chasing and selling, forced buying and selling.

c) There are unified management measures and means for commodity practitioners.

d) The variety of tourism products is rich, and the local and local tourism areas have outstanding characteristics.

5.1.7 Business Management

a) The management system is sound and the operating mechanism is effective.

b) The management systems for tourism quality, tourism safety, tourism statistics, and other related operations are sound and effective, with effective implementation measures, regular supervision and inspection, and complete written records and summaries.

c) The allocation of management personnel is reasonable, and middle to senior management personnel have a university or higher education level.

d) Having a unique product image, good quality image, distinct visual image, and civilized employee image, establishing one's own brand logo and using it comprehensively and appropriately.

e) There is an officially approved tourism master plan, and the development and construction projects meet the planning requirements.

f) The training institution and system are clear, personnel and funds are implemented, and business training is comprehensive with good results. The qualification rate of on-the-job personnel training reaches 100%.

g) The complaint system is sound, personnel are implemented,

equipment is dedicated, complaint handling is timely and appropriate, and archive records are complete.

h) Equip specific groups of people (elderly, children, disabled, etc.) with tourism tools and supplies, and provide special services.

5.1.8 Protection of resources and environment

a) The air quality meets the first level standard of GB 3095-1996.

b) The noise quality meets the Class I standard of GB 3096-1993.

c) The environmental quality of surface water meets the requirements of GB 3838.

d) Sewage discharge meets the requirements of GB 8978.

e) The natural landscape and cultural relics and historic sites are protected by scientific means and advanced measures, which can effectively prevent natural and man-made damage and maintain the authenticity and integrity of natural landscape and cultural relics and historic sites.

f) Scientifically manage tourist capacity.

g) The architectural layout is reasonable, and the volume, height, color, and shape of the building are coordinated with the landscape. The main architectural style of the entrance and exit is prominent, and it highlights the landscape and environment. The surrounding buildings are in harmony with the landscape style or have a certain buffer area.

h) The environmental atmosphere is excellent. High green coverage, appropriate plant and landscape configuration, diverse landscape and environmental beautification measures, and good results.

i) The facilities and equipment in the area meet the national requirements for environmental protection, do not cause environmental pollution and other public hazards, and do not damage tourism resources and atmosphere.

5.1.9 Attractiveness of Tourism Resources

a) The value of sightseeing and recreation is extremely high.

b) At the same time, it has extremely high historical value, cultural value, scientific value, or one of them has global significance.

c) There are a large number of precious species, unusual landscapes, or world-class resource entities.

d) The volume of resource entities is huge, or there are many types of resources, or the density of resource entities is extremely good.

e) The resource entity is intact and intact, maintaining its original form and structure.

5.1.10 Market attractiveness

a) Worldrenowned.

b) The reputation is extremely high.

c) The market has strong radiation power.

d) The theme is distinct, the characteristics are prominent, and the originality is strong.

5.1.11 Received over 600000 domestic and foreign tourists in 2011, including over 50000 overseas tourists.

5.1.12 The satisfaction rate of tourist sampling survey is very high.

5.3 AAA tourist attraction

5.3.1 Tourism transportation

a) Good accessibility. Complete transportation facilities and convenient access. Or have at least two levels of highways or higher-level waterways or air routes for direct access; Or have convenient transportation such as tourist routes.

b) There is a dedicated parking lot or ship dock that is coordinated with the landscape environment. And the layout is reasonable, and the capacity can meet the demand. The site is flat and solid, or the water area is unobstructed. The logo is standardized and eye-catching.

c) The layout of tour routes or waterways within the area is reasonable and smooth, with a large viewing area. The road surface is distinctive, or the water quality of the waterway is good.

d) Use low emission vehicles or encourage the use of clean energy vehicles within the area.

5.3.2 Tour

a) The tourist center has a reasonable location, moderate scale,

and complete facilities and functions. The tourist center has service personnel who are familiar with the business and provide enthusiastic service.

b) Various guide signs (including panorama of tour guide, guide map, signboard, scenery introduction board, etc.) have distinctive shapes and coordinate with the landscape environment. The setting of signage and scenery introduction signs is reasonable.

c) Public information materials (such as research papers, popular science books, comprehensive picture albums, audio-visual products, tour guides, and tour guide materials) are distinctive, diverse, rich in content, well produced, and updated in a timely manner.

d) The tour guide (interpreter) must hold a certificate and be able to meet the needs of tourists in terms of number and language. The Mandarin proficiency rate is 100%. Tour guides (interpreters) should have a high school education or above, with no less than 20% having a college degree or above.

e) The tour guide's (explanation) words are scientific, accurate, and vivid, and the service quality of the tour guide meets the requirements of Chapter 4.5.3 and Chapter 5 of GB/T 15971-1995.

f) The public infographic symbols are set reasonably and designed with characteristics, in accordance with GB/T 10001 1.

g) The layout of public rest facilities for tourists is reasonable, the quantity meets the needs, and the design is distinctive.

5.3.3 Tourism Safety

a) Seriously implement the safety regulations formulated and issued by relevant departments such as public security, transportation, labor, quality supervision, and tourism, establish a sound security system, and fully implement the work.

b) Fire protection, anti-theft, rescue and other equipment are complete, intact, and effective. Transportation, electromechanical, tourism, entertainment and other equipment are in good condition, operating normally, and without safety hazards. The amusement park meets the safety and service standards specified in GB/T 16767. Dangerous areas have clear signs, complete and effective protective facilities, and are guarded by dedicated personnel during peak hours.

c) Establish an emergency rescue mechanism, establish a medical clinic, and at least equip part-time medical personnel. Equipped with emergency response plans, strong emergency response capabilities, timely and appropriate accident handling, and accurate and complete archive records.

5.3.4 Hygiene

a) The environment is clean and tidy, free from sewage, dirt, disorderly construction, stacking, and littering. The buildings and various facilities and equipment are free from peeling and dirt, and the air is fresh and odorless.

b) All types of venues meet the requirements of GB 9664, catering venues meet the requirements of GB 16153, and swimming venues meet the requirements of GB 9667.

c) The layout of public toilets is reasonable, the quantity meets the needs, the signs are eye-catching, and the architectural design is coordinated with the landscape environment. All toilets are equipped with water flushing and ventilation equipment, and are kept in good condition or use non water flushing ecological toilets. The toilet is clean, and the sanitary ware is clean, free from dirt and blockage.

d) The layout of the garbage bin is reasonable, with clear markings, sufficient quantity, beautiful appearance, and coordination with the environment. Clean the garbage in a timely manner and clean it daily.

e) Food hygiene complies with national regulations, catering services are equipped with disinfection facilities, and disposable tableware that causes pollution is not used.

5.3.5 Postal and Telecommunications Services

a) Provide postal and postal commemorative services.

b) The layout of communication facilities is reasonable. There is a public telephone in the tourist concentration area, which has international and domestic direct dialing functions.

c) The public telephone booth is basically coordinated with the environment, with eye-catching signs.

d) Convenient communication, smooth lines, friendly service, and reasonable fees.

e) Able to receive mobile phone signals.

5.3.6 Tourism shopping

a) The layout of shopping venues is reasonable, and the architectural design, color, material, and environment are coordinated.

b) Centralized management of shopping venues should be carried out, with a clean and orderly environment, and there should be no phenomenon of chasing and selling, forced buying and selling.

c) There are unified management measures and means for commodity practitioners.

d) There are a variety of tourism products with local characteristics.

5.3.7 Business Management

a) The management system is sound and the operating mechanism is effective.

b) The management systems for tourism quality, tourism safety, tourism statistics, and other related operations are sound and effective, with effective implementation measures, regular supervision and inspection, and complete written records and summaries.

c) The allocation of management personnel is reasonable, with over 80% of middle and senior management personnel having a college degree or above.

d) Having a unique product image, good quality image, distinct visual image, and civilized employee image, establishing one's own brand logo and using it comprehensively and appropriately.

e) There is a formally approved overall plan, and the development and construction projects meet the planning requirements.

f) The training institution and system are clear, personnel and funds are implemented, and business training is comprehensive with good results. The qualification rate of on-the-job personnel training reaches 100%.

g) The complaint system is sound, personnel and equipment are implemented, complaint handling is timely and appropriate, and archive records are complete.

h) Can provide special services for specific groups (elderly, children, disabled, etc.).

5.3.8 Protection of Resources and Environment

a) The air quality meets the first level standard of GB 3095-1996.

b) The noise quality meets the Class I standard of GB 3096-1993.

c) The environmental quality of surface water meets the requirements of GB 3838.

d) Sewage discharge meets the requirements of GB 8978.

e) The protection of natural landscape and cultural relics and historic sites is scientific and effective, which can effectively prevent natural and man-made damage and maintain the authenticity and integrity of natural landscape and cultural relics and historic sites.

f) Scientifically manage tourist capacity.

g) The architectural layout is reasonable, and the volume, height, color, and shape of the building are coordinated with the landscape. The main building at the entrance and exit has a style that is coordinated with the landscape environment. The surrounding buildings are in harmony with the landscape style, or have a certain buffer zone or isolation zone.

h) The environmental atmosphere is good. The green coverage rate is high, the plants and landscape are properly configured, and the landscaping and environmental beautification effect is good.

i) The facilities and equipment in the area meet the national requirements for environmental protection, do not cause environmental pollution and other public hazards, and do not damage tourism resources and atmosphere.

5.3.9 Attractiveness of Tourism Resources

a) The value of sightseeing and recreation is high.

b) It also has high historical value, cultural value, scientific value, or one of them has provincial-level significance.

c) There are many precious species, unique landscapes, or provincial-level resource entities.

d) The volume of resource entities is large, or there are many types of resources, or the density of resource entities is good.

e) The resource entity is intact and basically maintains its original form and structure.

5.3.10 Market attractiveness

a) The surrounding provinces and cities are well-known.

b) High reputation.

c) The market has strong radiation power.

d) Has certain characteristics and has initially formed a theme.

5.3.11 Annual reception of over 300000 domestic and foreign tourists

5.3.12 High satisfaction rate of tourist sampling survey

6. The basis and method of dividing the quality level of tourist attraction

6.1 The quality level of tourist attraction shall be determined according to the classification conditions of the quality grade of tourist attraction, which shall be comprehensively carried out according to the evaluation scores of the Detailed Rules for Scoring Service Quality and Environmental Quality, the Detailed Rules for Scoring Landscape Quality, and the scores of the Detailed Rules for Scoring Tourist Opinions.

6.2 All qualified tourist attraction will be announced to the public by the national tourist attraction quality rating agency.

APPENDIX C THE WEIGHT CALCULATION PROCESS FOR THE LECTURER GROUP AND THE WORKING PROFESSIONAL GROUP

The weight of each indicator for each expert has been calculated in Chapter 3. The weight calculation process for the lecturer group and the working professional group is shown in the table below. (Interviewers 1, 2, 3 are the lecturer group, and 4, 5, and 6 are the working professional group.)

Weights of Interviewee	1	2	3	Geometric mean of lecturer group	Normalize geometric mean of lecturer group	Weights of lecturer group
Overall profitability(A)	13.93	55.50	17.16	23.67	29.24	29.24
Overall service level(B)	7.98	25.17	9.89	12.57	15.52	15.52
Competitiveness(C)	9.76	9.67	12.16	10.47	12.93	12.93
Coordinated development capability(D)	68.33	9.67	60.80	34.25	42.31	42.31
Weights of Interviewee	1	2	3	Geometric mean of lecturer group	Normalize geometric mean of lecturer group	Weights of lecturer group
Return on Assets (A1)	9.89	39.89	6.06	13.37	14.68	4.29
Tourism income growth rate(A2)	17.16	8.32	23.72	15.02	16.49	4.82
Tourism profit growth rate(A3)	36.48	16.07	39.92	28.60	31.42	9.19
Return on Tourism Investment(A4)	36.48	35.72	30.30	34.05	37.40	10.94
Weights of Interviewee	1	2	3	Geometric mean of lecturer group	Normalize geometric mean of lecturer group	Weights of lecturer group
Tourist satisfaction(B1)	26.70	60.80	51.94	43.85	48.86	7.58
Tourist complaint rate(B2)	51.34	17.16	7.89	19.08	21.26	3.3
Providing service ratio on time(B3)	10.09	12.16	20.09	13.51	15.05	2.34
Service flexibility(B4)	11.88	9.89	20.09	13.31	14.83	2.3

Weights of Interviewee	1	2	3	Geometric mean of lecturer group	Normalize geometric mean of lecturer group	Weights of lecturer group
Market share(C1)	75.00	50.00	50.00	57.24	59.05	7.64
Tourist growth rate(C2)	25.00	50.00	50.00	39.69	40.95	5.3
Weights of Interviewee	1	2	3	Geometric mean of lecturer group	Normalize geometric mean of lecturer group	Weights of lecturer group
Cooperation trust(D1)	46.67	63.34	47.96	52.14	58.47	24.74
Distortion rate of information transmission (D2)	46.67	10.62	11.50	17.86	20.03	8.47
Coordinated decision-making ability(D3)	6.67	26.05	40.55	19.17	21.50	9.09

Weights of Interviewee	4	5	6	Geometric mean of working professional group	Normalize geometric mean of working professional group	Weights of working professional group
Overall profitability(A)	48.13	54.44	37.50	46.14	47.84	47.84
Overall service level(B)	21.04	6.88	12.50	12.19	12.64	12.63
Competitiveness (C)	21.04	19.34	37.50	24.80	25.71	25.71
Coordinated development capability(D)	9.79	19.34	12.50	13.33	13.82	13.82

Weights of Interviewee	4	5	6	Geometric mean of working professional group	Normalize geometric mean of working professional group	Weights of working professional group
Return on Assets (A1)	48.44	48.44	30.00	41.29	42.35	20.26
Tourism income growth rate(A2)	13.02	13.02	10.00	11.92	12.23	5.85
Tourism profit growth rate(A3)	22.40	16.15	30.00	22.14	22.71	10.86
Return on Tourism Investment(A4)	16.15	22.40	30.00	22.14	22.71	10.86
Weights of Interviewee	4	5	6	Geometric mean of working professional group	Normalize geometric mean of working professional group	Weights of working professional group
Tourist satisfaction(B1)	62.80	54.96	54.44	57.28	57.54	7.27
Tourist complaint rate(B2)	6.37	9.79	6.88	7.54	7.58	0.96
Providing service ratio on time(B3)	15.42	19.71	19.34	18.04	18.13	2.29
Service flexibility(B4)	15.42	15.54	19.34	16.67	16.75	2.12

Weights of Interviewee	4	5	6	Geometric mean of working professional group	Normalize geometric mean of working professional group	Weights of working professional group
Market share(C1)	75.00	50.00	25.00	45.43	50.00	12.86
Tourist growth rate(C2)	25.00	50.00	75.00	45.43	50.00	12.86
Weights of Interviewee	4	5	6	Geometric mean of working professional group	Normalize geometric mean of working professional group	Weights of working professional group
Cooperation trust(D1)	66.87	71.43	60.00	65.93	66.85	9.23
Distortion rate of information transmission (D2)	8.82	14.29	20.00	13.61	13.80	1.91
Coordinated decision-making ability(D3)	24.31	14.29	20.00	19.08	19.35	2.67