THE STUDY OF RACECOURSES SITE SELECTION – A CASE STUDY OF HAINAN PROVINCE, CHINA

XIAOZHI WANG

MASTER OF BUSINESS ADMINISTRATION
IN
INTERNATIONAL LOGISTICS AND SUPPLY CHAIN MANAGEMENT

SCHOOL OF MANAGEMENT
MAE FAH LUANG UNIVERSITY
2021

THE STUDY OF RACECOURSES SITE SELECTION – A CASE STUDY OF HAINAN PROVINCE, CHINA

XIAOZHI WANG

THIS THESIS IS A PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF BUSINESS ADMINISTRATION
IN
INTERNATIONAL LOGISTICS AND SUPPLY CHAIN MANAGEMENT

SCHOOL OF MANAGEMENT
MAE FAH LUANG UNIVERSITY
2021

THE STUDY OF RACECOURSES SITE SELECTION – A CASE STUDY OF HAINAN PROVINCE, CHINA

XIAOZHI WANG

THIS THESIS HAS BEEN APPROVED
TO BE A PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION
IN
INTERNATIONAL LOGISTICS AND SUPPLY CHAIN MANAGEMENT
2021

EXAMINATION COMMITTEE

.....CHAIRPERSON
(Tipavinee Suwanwong Rodbundith, Ph. D.)

.....ADVISOR
(Pornwasin Sirisawat, D. Eng.)

.....EXAMINER
(Asst. Prof. Narat Hasachoo, D. Eng.)

.....EXTERNAL EXAMINER
(Assoc. Prof. Dr. Thananya Wasusri, Ph. D.)

ACKNOWLEDGEMENTS

First of all, I would like to thank my thesis advisor, Dr. Pornwasin Sirisawat from the School of Management of Mae Fah Luang University. Dr. Pornwasin Sirisawat has made guiding opinions and suggestions for the research direction of my thesis. In the process of writing the thesis, he gave careful guidance to the difficulties and doubts I met promptly put forward many beneficial suggestions for improvement, and invested a lot of effort and energy. Here I would like to express my sincere thanks to Dr. Pornwasin Sirisawa for his help and care.

At the same time, I would also like to thank the teachers and all the students from the School of Management of Mae Fah Luang University. Everyone learned from each other and helped each other, and spent a wonderful and unforgettable time together.

In addition, I would also like to thank my friends and classmates for their strong support and help in the writing of the thesis, which has brought me great inspiration. I also want to thank the authors in the references for their research articles, which gave me a good starting point for the research topic.

Finally, thank all the teachers for their hard work. I would like to express my heartfelt thanks to my family, friends and classmates for their encouragement and support in completing this thesis.

Xiaozhi Wang

Thesis Title	The Study of Racecourses Site Selection - A Case Study of Hainan Province, China
Author	Xiaozhi Wang
Degree	Master of Business Administration (International Logistics and Supply Chain Management)
Advisor	Pornwasin Sirisawat, D. Eng.

ABSTRACT

In April 2018, China Central Government-issued "The Chinese Communist Party Central Committee and the State Council on supporting Hainan's comprehensive deepening of reform and opening-up guidance" clearly stated that it encourages the development of horse racing, and explores the development of quiz-type sports lotteries and large-scale international competition instant lotteries in Hainan Province.

This document is the first time in nearly 70 years that the Chinese government has mentioned developing the horse racing industry in China. However, the main place where the horse racing industry takes place, that is, the racecourse, does not currently exist in Hainan Province. Therefore, in purpose to develop the horse racing industry, it is necessary to first determine the construction site of the racecourse.

This paper is devoted to deriving the evaluative indicators of the racecourse site selection, after that, evaluate the importance of each evaluative indicator, and the suitability of the racecourse construction and the horse racing industry development in three major cities in Hainan Province, that is, Haikou, Sanya and Danzhou, by using the AHP method.

The results showed that Haikou and Sanya are more suitable for racecourse construction and the horse racing industry development, but Danzhou is not suitable for the racecourse construction and the horse racing industry development.

Keywords: Horse racing, Racecourse, AHP, Hainan, Haikou, Sanya, Danzhou

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	**(3)**
ABSTRACT	**(4)**
LIST OF TABLES	**(8)**
LIST OF FIGURES	**(10)**
CHAPTER	
1 INTRODUCTION	**1**
1.1 Background	1
1.2 Research Objectives	4
1.3 Expected Outcome	4
1.4 Scope of Study	4
1.5 Conceptual Framework	5
2 LITERATURE REVIEW	**7**
2.1 Multi-Criteria Decision-Making and the AHP Method	7
2.2 Related Literature	14
2.3 The Evaluative Indicator	18
2.4 Hainan Province	23
2.5 Summary	27
3 RESEARCH METHODOLOGY	**28**
3.1 Research Design	28
3.2 Data Collection	29
3.3 Data Analysis	31
3.4 Analysis Framework	32

TABLE OF CONTENTS (continued)

	Page
CHAPTER	
4 RESULTS	**33**
4.1 AHP Results	33
4.2 Summary	51
5 CONCLUSION	**56**
5.1 Introduction	56
5.2 Addressing the Research Objective	56
5.3 Recommendation and Limitation	60
REFERENCES	**61**
APPENDIX	**72**
CURRICULUM VITAE	**82**

LIST OF TABLES

Table	Page
1.1 The market scale of the horse racing industry in some developed countries/ regions in 2016	2
2.1 The characteristics of several research techniques	8
2.2 Several of the existing researches	9
2.3 Measurement values for the importance of evaluative indicators	11
2.4 The value of random index	13
2.5 The evaluative indicators of the racecourse site selection	18
2.6 City level and some key statistics of cities in Hainan Province	26
3.1 The evaluative indicators of the racecourse site selection	30
4.1 Information of the respondents	34
4.2 Main evaluative indicators	34
4.3 Results of the main evaluative indicators part from the respondent numbered 1	35
4.4 Pairwise comparison from A1: Land acquisition and construction conditions to A6: Facilities and services	36
4.5 Weight of each main evaluative indicator assigned by the respondent numbered 1	38
4.6 Inner-weight of each sub evaluative indicator assigned by the respondent numbered 1	39
4.7 Weight of each main evaluative indicator and inner-weight of each sub evaluative indicator assigned by the respondent numbered 1	40
4.8 Weight of each main evaluative indicator assigned by the respondents	41
4.9 Inner-weight of each sub evaluative indicator assigned by the respondents	42
4.10 Final weight of each main evaluative indicator	43
4.11 Final inner-weight of each sub evaluative indicator	44

LIST OF TABLES (continued)

Table	Page
4.12 Final weight and ranking of each evaluative indicator	45
4.13 Points of each evaluative indicator and total points of each candidate city	47
5.1 Weight and ranking of each main evaluative indicator (In descending order of the weight)	57
5.2 Weight and ranking of each sub evaluative indicator (In descending order of the weight)	57
5.3 Points and ranking of each candidate city on each sub evaluative indicator (In descending order of the evaluative indicators' weight)	58

LIST OF FIGURES

Figure	Page
1.1 Conceptual framework	5
2.1 Location of Hainan Province	24
2.2 Topographical map of Hainan Province with main highways	25
2.3 Administrative map of Hainan Province	25
3.1 Analysis framework	32
4.1 Weight percentage of each main evaluative indicator	46
4.2 Points of each candidate city on main indicators	48
4.3 Points of each candidate city on sub-indicators	49
4.4 Points of each candidate city on sub-indicators with weight exceeding 5% of the total weight (In descending order of the weight)	50
4.5 Total points composition for each candidate city	51

CHAPTER 1

INTRODUCTION

This chapter aims to give an overview of the study. The main sections include background, the significance of the study, purposes of the study, research questions, expected outcomes, scope of the study and conceptual framework.

1.1 Background

Horse racing has a long history. The chariot race in the Roman Empire era has the prototype of horse racing. In the 12th century, the Crusades introduced purebred Arabian horses, which provided excellent horse breeds for horse racing. In the 18th century, with the development of the industrial revolution, in 1750, the world's first jockey club was established in Newmarket, England. And the basic rules and treaties for horse racing were concluded.

Today, horse racing is developing in more than 100 countries and regions (He & Zhang, 2018). In the United Kingdom, the United States, Japan, Hong Kong and other countries and regions, the horse racing industry has formed a complete industrial chain, the whole industrial chain includes the breeding of stallions, horse racing domestication, event operation, media broadcasting, catering and entertainment, horse racing betting, tourism and other aspects, has formed a huge market scale.

Take the Hong Kong Jockey Club as an example. It provides more than 10 billion HKD in taxes to the Hong Kong government every year, and its tax payment accounts for about 10% of the total revenue of the Hong Kong government. It also provides about 15,000 jobs directly to the people of Hong Kong (Animal Husbandry Department of Xinjiang Uygur Autonomous Region, 2016).

Table 1.1 The market scale of the horse racing industry in some developed countries/regions in 2016

Country / Region	Turnover (Million €)	Tax amount (Million €)
Japan	25,565	2,419
Hong Kong	14,365	1,603
The United Kingdom	11,941	220
The United States	10,193	N/A
Australia	10,001	400
France	8,951	862

Source He and Zhang (2018)

But today, horse racing is still on the exploratory stage in China. Important reasons include that commercial horse racing has long been considered inseparable from gambling, and its essence is a tool used by old social capitalists to squeeze people's blood and sweat. Horse racing is considered to be unable to coexist with the Communist Party-led socialist China.

Therefore, before this, the development of the horse racing industry in China did not have the support of a high-level government, but only developed in the form of private exploration. The results were not satisfactory. For example, in 1993, horse racing with gambling quality was tested in Guangzhou, with 10 CNY for one or two bets, which was popular in the local area. However, in 1999, the Guangzhou municipal party committee stopped horse racing, so the test ended abruptly, and the racecourse was changed to a parking lot.

But the good news is, on April 14, 2018, China central government issued "The Chinese Communist Party Central Committee and the State Council on supporting Hainan's comprehensive deepening of reform and opening-up guidance". In its fifth part, "Innovation and Promotion of the Construction of International Tourism Consumption Centers", it mentioned "Supporting the construction of a national sports

training southern base and a provincial sports center in Hainan, and encourages the development of beach sports, water sports, horse racing, etc. Support the creation of a national sports tourism demonstration zone. Explore the development of quiz-type sports lotteries and large-scale international competition instant lotteries. Explore support for the construction of tourism projects in terms of spatial planning, land supply and resource utilization."

Near the end of 2018, Hainan received another big gift. On December 28th, the National Development and Reform Commission issued "The Implementation Plan for Developing an International Tourism Consumption Center in Hainan Province". In the third part "Cultivating new forms of tourism consumption", again, the document says "Encourage the development of horse racing" and "Explore the development of quiz-type sports lotteries and large-scale international competition instant lotteries.".

In the past, when governments at all levels issued policy documents related to horse racing, they used the term "Equestrianism" for the sake of avoiding public speculation about the opening of horse racing gambling.

These two documents in 2018 are the first time in nearly 70 years that a high-level government has mentioned horse racing explicitly. And these two consecutive documents are considered as a sign of the Chinese government's vigorous promotion of horse racing in Hainan Province. It may even promote horse racing betting.

Now, with the state's strong support for the development of the horse racing industry in Hainan Province, the problem has come. It is obvious that the core of the horse racing industry is the horse racing competition, and the horse racing competition takes place in racecourses. Currently, there are no racecourses in Hainan Province. To develop the horse racing industry, new racecourses must be built first. Therefore, the location of the racecourse should be determined first. And because the racecourse covers a huge area and costs a lot of money. For example, the Meydan Racecourse in the United Arab Emirates covers an area of up to 7.5 square kilometers. The entire racecourse, together with the neighboring Meydan City development plan, covers an area of 19 square kilometers. Total investment exceeds $3 billion. Therefore, the location of the construction should be carefully considered.

In addition, the horse racing industry is a brand-new industry for China. Researches on racecourse site selection in China are rare. To respond to the policy

orientation and enable the horse racing industry to develop better, research on racecourse site selection has become a top priority.

1.2 Research Objectives

This paper will try to derive the evaluative indicators of the racecourse site selection. By using the AHP model, weight the importance of each evaluative indicator, and then evaluate the suitability of racecourse construction in three major cities in Hainan Province. Finally, give opinions on the racecourse construction city.

Research Questions

Research question 1: What are the important evaluative indicators affecting the racecourse site selection? What is the weight of each evaluative indicator?

Research question 2: What are the suitable cities in Hainan Province to construct the racecourse?

1.3 Expected Outcome

Expected outcome 1: Find out the important evaluative indicators that affecting the racecourse site selection. Use the AHP method to find out the weight of each evaluative indicator.

Expected outcome 2: Use the AHP method to evaluate the suitability of racecourse construction in three major cities in Hainan Province.

1.4 Scope of Study

This paper tries to find out the important evaluative indicators that affecting the racecourse site selection and to find out the importance of each evaluative indicator. Finally, the construction suitability of three major cities in Hainan Province will be evaluated and corresponding suggestions will be given.

The racecourse construction and the horse racing industry are involved in government coordination, venue construction, sports, tourism, betting and other industries, and the candidates of this study are all cities in Hainan Province. Therefore, the data sources of this study will be obtained from government staff, senior practitioners and scholars who are familiar with the above-mentioned and familiar with the local conditions in Hainan Province.

Although the sample size is small for this study, respondent size is not a limitation as the AHP method can be conducted with a small number of responses. In addition, AHP is designed to survey people who have specific knowledge about the topic, such as decision-makers (Masozera et al., 2007).

1.5 Conceptual Framework

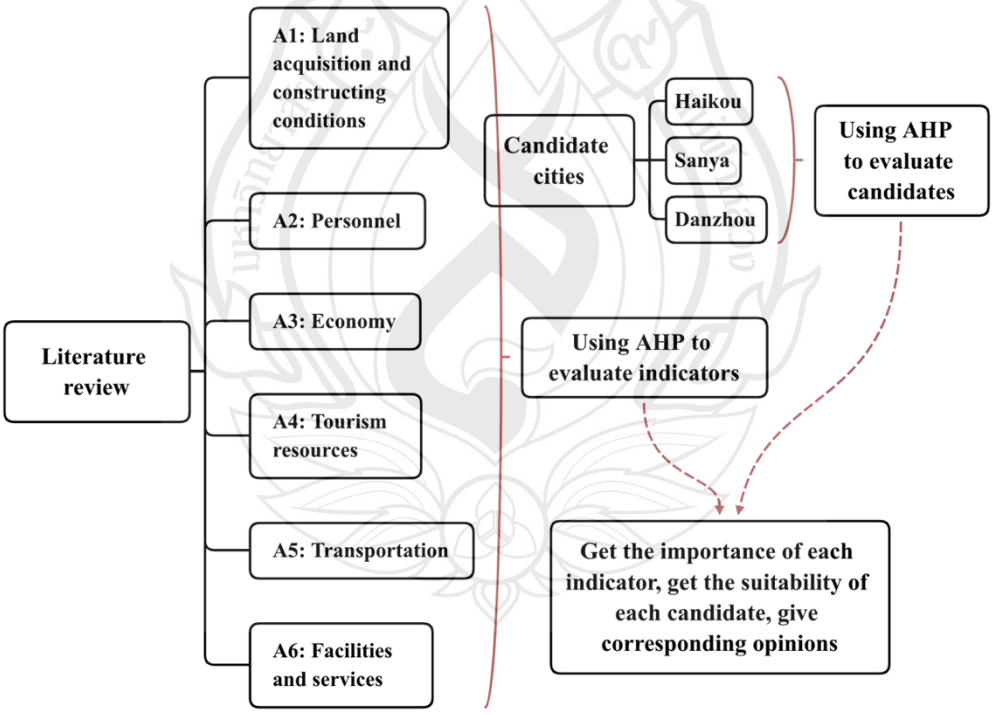

Figure 1.1 Conceptual framework

Figure 1.1 illustrated the conceptual framework of this paper. The AHP method is used to analyze and prioritize the importance of each evaluative indicator. The 6 main evaluative indicators were derived from the literature review and the status quo of Hainan Province.

After analysis, this paper will give corresponding suggestions on the racecourse site selection in Hainan Province. The proposed strategy would be based on the AHP method, which will prioritize the evaluative indicators and evaluate the suitability of the candidate cities.

CHAPTER 2

LITERATURE REVIEW

This chapter will introduce the AHP method, existing researches that are relevant to the research area of this paper, and the profile of Hainan Province.

2.1 Multi-Criteria Decision-Making and the AHP Method

2.1.1 Multi-Criteria Decision-Making

Multiple-criteria decision-making (MCDM) or multiple-criteria decision analysis (MCDA) refers to the process of determining the best feasible solution according to an established multiple criteria problem. For example, when purchasing a car, buyers usually consider the car's price, comfort, safety, fuel consumption, etc. These criteria are likely to conflict with each other. The process of finding out the best car to buy can then be called MCDM.

The process of identifying the most suitable cities for racecourse construction in Hainan Province also belongs to MCDM. To find out the most suitable cities for racecourse construction in Hainan Province, we must first identify the technique to be used in this paper. There are various techniques used for MCDM, such as AHP, fuzzy comprehensive evaluation method (fuzzy), The Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS), Entropy weight method (EWM), Analytic network process (ANP), etc. The characteristics of several research techniques are organized as shown in Table 2.1, several of the existing researches are organized as shown in Table 2.2.

Table 2.1 The characteristics of several research techniques

Research technique	Characteristic
AHP	Simple and clear. Not only suitable for situations where there is uncertainty and subjective information but also allows for the logical application of experience, insight and intuition.
Fuzzy	Use fuzzy mathematics to make a general evaluation of things or objects that are subject to multiple factors. It has the characteristics of clear and systematic results, and can better solve the fuzzy and difficult to quantify problems.
TOPSIS	Simple and clear. Through the normalized data normalization matrix, the optimal target and the worst target among multiple targets can be found at the same time.
EWM	Entropy is a measure of uncertainty, by calculating the entropy value to determine the randomness of an indicator, the greater the randomness of the indicator, the greater the impact of the indicator on the comprehensive evaluation.
ANP	Based on the analytic hierarchy process, takes the interaction of indicators or decision-making levels into account, allows feedback relationships between indicators, it is a non-linear structure.

Table 2.2 Several of the existing researches

Technique	Research content	Author	Year
AHP	Used contractor prequalification problem as an example, Introduced the application of AHP in project management.	Al-Harbi	2001
	Studied a real case and examined its feasibility in selecting a vendor for a telecommunications system.	Tam and Tummala	2001
	From the view of organizations, presented an AHP model for facility location selection, and used an example to illustrate the solution process.	Yang and Lee	1997
Fuzzy	Studied the site selection of a wind power farm and obtained the final best site selection.	Na	2015
	Evaluated regional water resources capacity for further utilization of water resources and sustainable socio-economic development.	Gong and Jing	2009
TOPSIS	Researched the operational KPIs of small airports.	Wangdra	2018
	Identified the relevance of the financial ratios to the evaluation result, and indicate the performance difference between companies on each financial ratio.	Deng et al.	2000
EWM	Studied the environmental impact of a mining project in Peru.	Delgado and Romero	2016
	Studied the water quality indicators of Brahmani River and evaluated the trends of water quality.	Sahoo et al.	2017
ANP	Analysed the effect of market winning criteria and market qualifying criteria on the three types of supply chains: lean, agile and leagile.	Agarwal et al.	2006
	Examined the case of a company executive's decision on the best photovoltaic solar project with the goal of minimizing risk.	Aragonés-Beltrán et al.	2010

Summary: Through the characteristics of these research techniques and reading the existing literature, the author finds that the AHP method is simple and easy to use, suitable for situations where there is uncertainty and subjective information and is widely used in project management and site selection. The author believed that the AHP method is the most suitable technique to solve the problem of Hainan racecourse site selection in this paper, so the author chooses to use the AHP method to solve this problem.

2.1.2 The AHP Method

The analytic hierarchy process (AHP) was proposed by Saaty, a professor at the University of Pittsburgh, in 1971. It is mainly used for complex decision problems with uncertain conditions and multiple evaluative indicators. Through the establishment of a hierarchical structure, hierarchical decomposition is performed from top to bottom to simplify complex problems. It helps to describe the degree of influence of high-level elements on low-level elements, and decision-makers use pairwise comparisons to determine their subjective preference comparisons. Objectively quantified research methods are dealing with the two elements. The preference comparison is based on nine scales to assist decision-makers to make preference comparisons.

The theory and concept are simple and practical, and the complexity of the problem is flexible and easy to expand. Decision problems such as deciding priorities, choosing the best solution, deciding requirements, planning, and optimization are suitable for the AHP method.

AHP has the following 3 phases:

Phase 1: Establishing a hierarchical structure

Decompose the complex decision-making problems and establish a hierarchical structure and hierarchical elements (evaluative indicators) for impact assessment. Among them, each level of elements is recommended to be less than 7. Decision-makers can make reasonable comparisons and maintain consistency.

Phase 2: The weight calculation of each level element can be further divided into the following three steps:

Step 1: Establish a pairwise comparison matrix to compare pairwise elements in the hierarchy. Assuming that there are n evaluative indicators, n (n-1) / 2 pairwise comparisons are needed.

The evaluation scale of the pairwise comparison is divided into five scales, including extremely important, very strongly important, strongly important, moderately important, and equally important. And assign these measurement values as 9, 7, 5, 3, 1, and another 4 measurement values are between the basic evaluation scales and assigned them as 8, 6, 4, 2. See table 2.3.

Table 2.3 Measurement values for the importance of evaluative indicators

Importance scale	Definition
1	Equally important
2	Equally to Moderately important
3	Moderately important
4	Moderately to Strongly important
5	Strongly important
6	Strongly to Very Strongly important
7	Very Strongly important
8	Very Strongly to Extremely important
9	Extremely important

Source Taherdoost (2017)

The pairwise comparison matrix A and its elements are represented as follows:

$$A = \left[a_{ij}\right] = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ a_{21} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & 1 \end{bmatrix}$$

Where a_{ij} represents the result of comparing element i with element j. If the importance of element i is 3 times the importance of element j, then $a_{ij} = 3$, $a_{ij} = 1/ a_{ij}$

=1/3, and the value of the upper right triangle indicates the relative importance between the elements. The lower left triangle is the inverse of the value of the relative position of the upper right triangle.

Step 2: Calculate eigenvectors and eigenvalues

After the pair comparison matrix is established, the eigenvector value can be obtained through the eigenvalue solution in numerical analysis. This is the weight w of each level element. Saaty proposes 4 approximate methods: (1) Average of Normalized Columns (ANC), (2) Normalization of the Row Average (NRA), (3) Normalization of columns and reciprocal, (4) Normalization of the Geometric Mean of the Rows (NGM) (Satty, 1990).

The fourth method of the above 4 methods has higher accuracy and is more commonly used. Therefore, this study intends to use the fourth method to calculate the eigenvector (Kang, 2012). Its formula is:

$$W_i = \left(\prod_{j=1}^{n} a_{ij}\right)^{\frac{1}{n}} / \sum_{i=1}^{n} \left(\prod_{j=1}^{n} a_{ij}\right)^{\frac{1}{n}} \quad i, j = 1, 2, 3, \ldots\ldots\ldots \mathrm{n}$$

Using the obtained eigenvector (weight *w*), the consistency vector (CV) is calculated as *v*, and the formula is:

$$v_i = \left(\sum_{j=1}^{n} w_j a_{ij}\right) / w_i \quad i, j = 1, 2, \ldots\ldots, n$$

After finding the consistency vector *v*, the arithmetic mean is the eigenvalue λ. The formula is:

$$\lambda = \frac{\sum_{i=1}^{n} v_i}{n} \qquad i = 1,2,\ldots\ldots\ldots, n$$

Step 3: Consistency check

The values in the pairwise comparison matrix are subjective judgments made by decision-makers. If there are too many levels of evaluative indicators, it may cause decision-makers to make inconsistent judgments under the judgment of pairwise comparisons, so consistency is required. The consistency check uses the consistency

ratio (CR) to determine whether the pairwise comparison matrix made by the decision-maker is a consistency matrix. Before calculating the consistency ratio (CR), need to calculate the consistency index (CI), the formula of consistency index is:

$$\text{C.I.} = \frac{\lambda - n}{n - 1}$$

Where λ is the eigenvalue, n is the number of elements of this level, and CI = 0 indicates that there is no contradiction in the judgment of the decision-maker.

Finally, to validate the results, the consistency ratio (C.R.) needs to be calculated. The formula of C.R. is:

$$\text{C.R.} = \frac{\text{C.I.}}{\text{R.I.}}$$

The value of the random index (R.I.) is related to the dimension of the matrix, R.I. does not need to calculate, but uses the value summarized by Saaty, as shown in table 2.4.

Table 2.4 The value of random index

n	1	2	3	4	5	6	7	8
R.I.	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41

When the C.R. value is less than 0.1, the consistency of the pairwise comparison matrix made by the decision-maker is acceptable.

Phase 3: weight calculation of overall hierarchy elements

When the weight of each element in each level is calculated, the total weight of each element can be solved.

According to the weight of each candidate, determine the priority of each candidate and determine the best solution.

2.2 Related Literature

2.2.1 Research on the Horse Racing Industry

To study the racecourse site selection, it is necessary to have a certain understanding of the horse racing industry, the operation mode of the horse racing industry, the current situation and problems of the Chinese horse racing industry.

The birth of modern horse racing was marked by the establishment of the English jockey club in 1751. With the development of society, the form of the horse racing industry is also in continuous development.

De Felice and Petrillo (2013) used the AHP model, took the quality organization of racing, infrastructure and equipment, attractiveness and finally management skill as the evaluative indicator, constructed a model for evaluating the Italian racecourse. It is concluded that the most important factor affecting the competitiveness of an established racecourse is “Infrastructure and Equipment”.

Xia, Yang and Xia (2014) believe that the bottleneck of China’s horse racing industry is that it only treats horse racing like a horse race, and does not combine the horse racing industry with the downstream service industry. He believes that people in modern society are more in pursuit of service enjoyment, so the combination of horse racing and the downstream service industry should be promoted.

Sun and Tang (2011) believes that the value of the horse racing industry is small, the core industry is lacking, the level of the industry chain is low, and the immature players in the horse racing market are the existing problems in the Chinese horse racing industry. In the process of developing the horse racing industry in China, he believes that the most important thing is to develop the horse racing service industry because the horse racing service industry has a direct role in pulling other parts of the horse racing industry. It is an important sign of the optimization and upgrading of the horse racing industry structure.

Deng and Zeng (2016) researched the horse racing industry in Hubei Province, China, and tried to define the horse racing cultural industry. He pointed out that there are many deficiencies in the horse racing cultural industry in Hubei Province, including insufficient consumption of horse racing cultural products, lack of legal basis, and

policy guarantees. Give suggestions on trying to sell horse racing lottery tickets and establishing a horse racing culture innovation center.

Summary: By consulting a large amount of literature, it can be seen that the research on the horse racing industry in Europe and the United States is mainly focused on the innovation of horse racing betting, and there are fever researches on the other aspects of the horse racing industry. Europe and the United States horse racing industry have been relatively complete. The main problem currently facing is the old-fashioned way of betting may be the reason for this phenomenon.

China's research on horse racing is mainly focused on learning advanced European and American experiences, pointing out the current shortcomings of the horse racing industry in China and giving suggestions.

2.2.2 Research on the Site Selection

Since the topic of this paper is "Study on the site selection of racecourses", the literature review on the site selection mainly focuses on the large sports venues or comprehensive commercial facilities.

Li (2018) studied the location of county-level sports centers. He believed that the main factors affecting the location of county-level sports centers were spatial planning, economic and social factors, transportation conditions, infrastructure factors, and environmental conditions. Finally, the location of two sports centers in Foshan City is analyzed.

Liu and Li (2009) studied the current situation of racecourse and gambling casino in Hong Kong and the United States and used it as a reference to study the site selection of racecourse in Miaoli county, Taiwan. In the site selection decision, they mainly consider five factors: the complementarity of adjacent areas, transportation cost, government policy, tourism resources and green landscape.

Shen (2013) used the FAHP method to establish evaluation indicators for large-scale gymnasiums. The main indicators established by him include four items: planning space, road transportation, socioeconomic, infrastructure and environmental factors, and 17 sub-items. And gave opinions on the construction site of the Hangzhou Olympic Sports Expo City.

Chou, Hsu and Chen (2008) divided hotel evaluative indicators into geographical conditions, transportation conditions, hotel characteristics and operation management, etc., in the study of site selection decisions of tourist resorts. Finally, the validity of the model is verified by an empirical study on the location selection of international tourist hotels.

Summary: Through literature review, it can be seen that there are abundant studies on site selections, but there are few studies on the racecourse site selection or sports venues Therefore, this study also makes a lot of reference to the study on the site selection of comprehensive commercial facilities.

2.2.3 Research on the Tourism Industry and Tourism Industry Competitiveness

Since the possibility of horse racing betting in China is unclear, it is more practical to consider developing the horse racing industry in the form of horse racing tourism direction, so tourism industry and tourism competitiveness also need to focus on.

Up to now, sports tourism as an industry has been studied for decades. A large number of papers on this topic have been published in many countries around the world, such as:

Kurtzman and Zauhar (1997) classified sports tourism into five types: vacation sports tourism, leisure sports tourism, sailing sports tourism, sports attractions tourism, and sports events tourism.

Gibson (1998) based on the three behavioral characteristics of sports tourism, divides sports tourism into the following three types. (1) Active sports tourism: travel to participate in sports activities or events. (2) Event sports tourism: a sports tour to watch a sports match. (3) Nostalgic sports tourism: sports tourism attracted by famous sports venues or sports stars.

Gratton, Dobson and Shibli (2000) analyzed the economic value of large-scale events for sports tourism by analyzing a series of events such as the 1996 European Cup and the 1998 European Short Pool Swimming Championships and the 1999 World Judo Championships.

Lasanta, Laguna and Vicente-Serrano (2007) studied the effects of ski tourism on the local population, industry, socio-economic aspects of Spain.

Gao (2006) conducted a study on the sports tourism industry in the Yangtze River Delta. The study concluded that the Yangtze River Delta has advantages such as abundant resources and the construction of a sports circle in the Yangtze River Delta. There are also a series of problems, such as the incomplete integration of sports and tourism. The level of operation is not high. It also provides a series of countermeasures. The state and the government should carry out macro-control, overall planning, coordinate and rational development of resources, plan the market and improve related laws and regulations, and expand the sports tourism source market.

Zhang (2014) researched the development path of the sports tourism market. Taking the Shandong Canal Cultural Belt as an example, they believe that the existence of sports tourism industry service quality is not high. The following opinions were given: 1. Extending the industrial chain and forming a complete system; 2. Preparing to build large-scale amusement facilities; 3. Introducing large-scale media and cultural companies; 4. Actively applying for large-scale sports events.

Cui et al. (2018) established a model of coastal sports tourism competitiveness by using the entropy-TOPSIS method. The model included four major factors: tourism performance competitiveness, tourism resource security, economic development support and ecological environment support. And obtained the coastal tourism competitiveness of coastal cities in China.

Wang and Zhou (2018) based on AHP, analyzed the influencing factors of the development of the snow and ice sports tourism industry. Their model included four major influencing factors, namely, expanding consumption, training of professional talents, relevant government policies, and research and development of technical products. After being rated by experts, they believed that expanding consumption was the most important factor for the development of the snow and ice industry.

Hudson, Ritchie and Timur (2004) using a newly developed tourism destination competitiveness model, compared the competitiveness of ski resorts in Canada, described the advantages and disadvantages of each resort, and established the basis for developing a comprehensive and standardized model.

Nong (2014) conducted an empirical study on the competitiveness of sports tourism in 14 prefecture-level cities under China's Guangxi Province and built four indicators including performance competitiveness, potential competitiveness, economic competitiveness and environmental competitiveness. 9 secondary indicators, 48 tertiary indicators. The rankings of the sports tourism industry competitiveness of these 14 cities were sorted and corresponding opinions were given.

Summary: Through literature review, it can be seen that there are some existing studies on tourism competitiveness, but there are few studies on the combination of site selection and tourism competitiveness. Therefore, this paper will conduct a further study by combining the construction and sports tourism competitiveness to study the racecourse site selection.

2.3 The Evaluative Indicators

After reviewing and researching a large quantity of literature, and the status quo of Hainan Province, the evaluative indicators of this paper are derived as 6 main evaluative indicators, 22 sub evaluative indicators, as shown in table 2.5.

Table 2.5 The evaluative indicators of the racecourse site selection

Main evaluative indicator	Sub evaluative indicator	Reference
A1: Land acquisition and construction conditions	B11: Land acquisition cost B12: Demolition difficulty B13: Land supply B14: Geological conditions	Chou, Hsu and Chen (2008); Zhang (2014); Liu and Li (2009); Li (2018); Gao (2006)
A2: Personnel	B21: Middle and high-end Personnel B22: General labor	Wang and Zhou (2018); Ertuğrul and Karakaşoğlu (2008); Yan (2017); De Felice and Petrillo (2013)

Table 2.5 (continued)

Main evaluative indicator	Sub evaluative indicator	Reference
A3: Economy	B31: Economic base B32: Ability to attract investment B33: Spending power B34: Horse racing betting potential	Zhong (2014); Jing (2008); Yan (2017); Wang and Zhou (2018); Li (2018); Ertuğrul and Karakaşoğlu (2008); Tam, Tsai and Chen McCain (2013)
A4: Tourism resources	B41: Terrestrial landscape B42: Maritime landscape B43: Biological landscape B44: Cultural attractions B45: Climatic conditions	Jing (2008); Zhang and Wang (2018); Kurtzman and Zauhar (1997); Hudson, Ritchie and Timur (2004); Nong (2014)
A5: Transportation	B51: Road transportation capacity B52: Rail transportation capacity B53: Sea transportation capacity B54: Air transportation capacity	Tzeng et al. (2002); Chou, Hsu and Chen (2008); Jing (2008); Zhong (2014); Vallen and Vallen (2009); Yan (2017)
A6: Facilities and services	B61: Catering and accommodation B62: Other facilities and services B63: Social security	Zhang (2014), Liu and Wang (2018); Jing (2008); Gao (2006); De Felice and Petrillo (2013)

2.3.1 A1: Land Acquisition and Construction Conditions

The construction of the racecourse first requires the acquisition of a large area of land, among which the main factors to be considered should include the cost of land acquisition, the difficulty of relocation for residents, and the difficulty of land acquisition for subsequent development. Besides, whether the local natural and geological conditions can facilitate construction should also be considered (Chou, Hsu & Chen, 2008; Zhang, 2014; Liu & Li, 2009; Li, 2018; Gao, 2006).

2.3.1.1 B11: Land acquisition cost: With the development of China's social economy, the land acquisition price is also increasing, and due to the regional

differences, the land acquisition price also has a significant difference, so the land acquisition cost should be considered.

2.3.1.2 B12: Demolition difficulty: China is a vast country with many ethnic groups, and there are many ethnic minorities in Hainan Province. People from different regions or ethnic groups also place different values on ancestral homes. This may cause greater resistance to moving people from some areas than from others.

2.3.1.3 B13: Land supply: As the racecourse, itself covers a large area and involves a complex industrial chain, the land must not only meet the needs of the racecourse itself, but also take into accounts the related land, such as the demand for catering, entertainment, etc., and there is the possibility of subsequent expansion of the industrial chain, so land reservation must also be considered.

2.3.1.4 B14: Geological conditions: Whether the local natural conditions are conducive to the construction, the factors to be considered include topographic relief, soil quality, groundwater level, etc.

2.3.2 A2: Personnel

For the study of development prospects, human resource is a must to consider, which includes not only the high-end personnel in the top leadership position but also the ordinary workers working in the front line (Wang and Zhou, 2018; Ertuğrul and Karakaşoğlu, 2008; Yan, 2017; De Felice and Petrillo, 2013).

2.3.2.1 B21: Middle and high-end Personnel: The indicator mainly studies whether each city has sufficient mid to high-end personnel or has a strong appeal to mid to high-end personnel and whether it can meet the talent needed in management and other positions in these complex industrial chains.

2.3.2.2 B22: General labor: Whether there are enough ordinary workers in each city and whether it can meet the demand for a large number of service personnel.

2.3.3 A3: Economy

As one of the potential important engines of future urban development, the racecourse site, which is the supporting entity of the horse racing industry, should be given priority consideration to the economic status and potential of the candidate cities

where it may be located (Zhong, 2014; Jing, 2008; Yan, 2017; Wang & Zhou, 2018; Li, 2018; Ertuğrul & Karakaşoğlu, 2008; Tam, Tsai & Chen McCain, 2013).

2.3.3.1 B31: Economic base: The economic base can well reflect the city's overall economic development level and ability to develop various industries.

2.3.3.2 B32: Ability to attract investment: The construction of a racecourse is costly, and the entire industrial chain is complex, requiring a large amount of investment. Therefore, it is necessary to examine whether candidate cities can attract sufficient investment.

2.3.3.3 B33: Spending power: This evaluative indicator mainly examines the spending power of the residents in candidate cities. Because the combination of the horse racing industry belongs to the service industry, and its development is mainly based on the consumption of the people, the consumption capacity of the residents has a certain reference value to this topic.

2.3.3.4 B34: Horse racing betting potential: The introduction of the latest policy has provided Hainan with the possibility to develop horse racing betting. According to the well-developed horse racing industry in the world, horse racing betting is one of the most important directions of the development of the horse racing industry. Therefore, it is necessary to consider the development potential of horse racing betting in the candidate cities.

2.3.4 A4: Tourism Resources

The existing tourism resources of each candidate city have an important impact on the number of tourists it can attract. According to the types of resources and the status quo of Hainan Province, this paper divides tourism resources into five aspects: terrestrial landscape, maritime landscape, biological landscape, cultural attractions, climatic conditions (Jing, 2008; Zhang & Wang, 2018; Kurtzman & Zauhar, 1997; Hudson, Ritchie & Timur, 2004; Nong, 2014).

2.3.4.1 B41: Terrestrial landscape: Based on the actual situation of Hainan Province, the main factors to be considered in this evaluative indicator include the coastal mountain landscape, urban appearance, sandy beach area, number of baths, etc.

2.3.4.2 B42: Maritime landscape: This evaluative indicator mainly includes seawater temperature, seawater quality, seawater transparency, underwater reefs, underwater attacking animals, sea fishing suitability, etc.

2.3.4.3 B43: Biological landscape: The biological landscape includes animal species, vegetation species, animal and plant ornamental, greening conditions, etc.

2.3.4.4 B45: Climatic conditions: Factors to be considered include air temperature, air humidity, air quality, the possibility of rainfall, the possibility of natural disasters, etc.

2.3.5 Transportation

Transportation has a significant impact on the convenience of the movement of people or goods, which not only includes the people or goods within the area but also includes the convenience of the people or goods between the area and other areas (Tzeng et al., 2002; Chou, Hsu & Chen, 2008; Jing, 2008; Zhong, 2014; Vallen & Vallen, 2009; Yan, 2017).

2.3.5.1 B51: Road transportation capacity: Road transportation mainly affects the convenience of moving within the city and between cities within Hainan Province. Factors to be considered include bus lines, subway lines, number of taxis, road conditions, traffic accident rate, whether the city is close to the entrance and exit of expressways, etc.

2.3.5.2 B52: Rail transportation capacity: This indicator mainly examines the ability of each candidate city to move people and goods by rail with other cities on the island.

2.3.5.3 Sea transportation capacity: This evaluative indicator examines the sea transportation capabilities of each city, its ability to connect with other cities within the island and without the island by sea, and the potential to combine horse racing and cruise tourism.

2.3.5.4 Air transportation capacity: This indicator examines each city’s ability to connect to other cities, both domestic and international, by plane.

2.3.6 A6: Facilities and Services

Facilities and services mainly include municipal supporting facilities, public service supporting facilities, etc. The development of the horse racing industry requires the public facilities in their cities as a guarantee (Zhang, 2014; Liu & Wang, 2018; Jing, 2008; Gao, 2006; De Felice & Petrillo, 2013).

2.3.6.1 B61: Catering and accommodation: This indicator examines whether the candidate city has enough hotels and restaurants of various levels to cater to a large number of tourists with different levels of needs.

2.3.6.2 B62: Other facilities and services: That is, except catering and accommodation, the abundance of other facilities, such as the number of tourist service centers, the number of public toilets, multilingual street signs, etc.

2.3.6.3 B63: Social security: This item is used to judge the law and order status of candidate cities. That is, the ability to protect the safety of tourists' lives and property. It can be inspected from the incidence of various law and order cases.

2.4 Hainan Province

Hainan Province, abbreviated as Qiong, is the only province of China located entirely in the tropics, and is also an oceanic and island province, with the largest marine area and the smallest land area in China. It has a population of about 10.08 million in 2020, with a large migratory population living in winter.

Hainan Province can be geographically divided into Hainan Main Island and the South China Sea Islands (Hainan Outlying Islands), of which the Main Island is located in the northwestern part of Hainan Province, roughly equivalent to Hainan Island and its territorial affiliated islands, with no territorial disputes with neighboring countries; the Outlying Islands are located in the north-central to the southern part of Hainan Province, roughly equivalent to the Zhongsha Islands, Xisha Islands and Nansha Islands under the legal jurisdiction of Sansha City, with territorial disputes with neighboring countries.

In 1988, the First Session of the Seventh National People's Congress passed a resolution to abolish the administrative region of Hainan in Guangdong Province and

establish Hainan Province, making Hainan the 30th provincial administrative region of China and by far the youngest province in China.

Hainan has jurisdiction over 4 prefecture-level cities, 5 county-level cities, 4 counties and 6 autonomous counties. The location and key statistics of each city are shown in Figure 2.3 and Table 2.6.

Figure 2.1 Location of Hainan Province

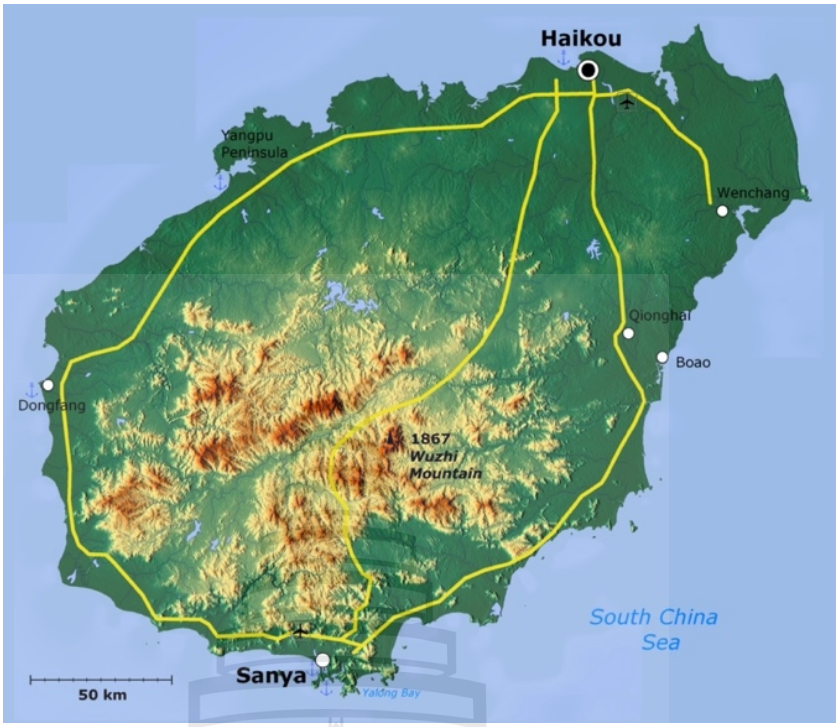

Figure 2.2 Topographical map of Hainan Province with main highways

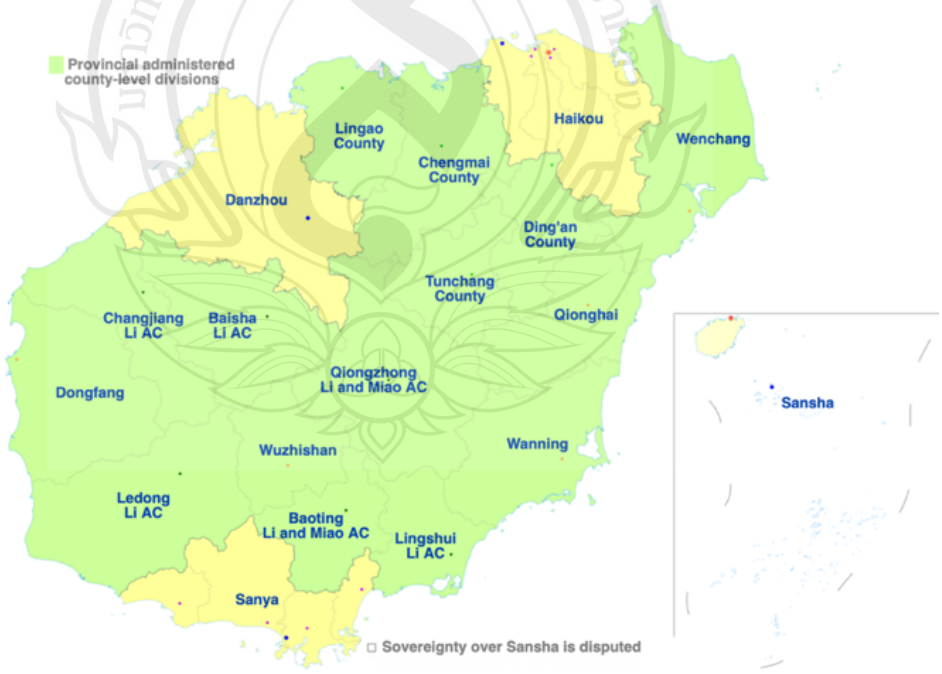

Figure 2.3 Administrative map of Hainan Province

Table 2.6 City levels and some key statistics of cities in Hainan Province

Division level	Division	Area (km^2)	Population (2020)	GDP (2020, billion CNY)	GDP per capita (2020, CNY)
N/A	Hainan Province	35191.0	10,081,232	553.2	54874
Prefecture-level city	Haikou	2304.8	2,873,358	179.2	62366
	Sanya	1910.7	1,031,396	69.5	67384
	Danzhou	3394.0	954,259	63.9	66963
	Sansha	788.0	2,333	N/A	N/A
County-level city	Wuzhishan	1131.0	112,269	3.4	30284
	Qionghai	1710.1	528,238	29.2	55278
	Wenchang	2459.2	560,894	26.4	47068
	Wanning	1899.9	545,992	23.7	43407
	Dongfang	2272.3	444,458	18.7	42074
County	Ding'an	1187.0	284,690	10.6	37233
	Tunchang	1224.0	255,335	8.9	34856
	Chengmai	2076.3	497,953	34.8	69886
	Lingao	1343.3	420,594	20.4	48503
Autonomous county	Baisha	2117.2	164,699	5.7	34609
	Changjiang	1617.7	232,124	12.4	53420
	Ledong	2763.5	464,435	15.1	32513
	Lingshui	1121.2	372,511	19.6	52616
	Baoting	1166.8	156,108	5.6	35873
	Qiongzhou	2704.0	179,586	5.9	32853

According to Figure 2-3 and Table 2-4, it can be seen that there are 4 prefecture-level cities in Hainan Province, namely Haikou, Sanya, Danzhou, and Sansha. Sansha city is not considered in this paper because it is an outlying island with a very small land area and disputed sovereignty.

In addition to Haikou, Sanya, and Danzhou, Hainan Province has 15 other cities including county-level cities, counties and autonomous counties. But according to Table 2-4, they are significantly inferior to the above 3 prefecture-level cities in most key statistics. Therefore, the authors decided to choose the above 3 prefecture-level cities as candidates for the racecourse site selection in Hainan Province and will evaluate the suitability of the racecourse site selection for them.

2.5 Summary

This chapter mainly introduced the function of the AHP method and the operation steps. In terms of literature review, this paper mainly consulted three aspects: the horse racing industry, site selection, and the tourism industry. Through literature review, the achievements have been obtained, and the existing research deficiencies have been discovered, evaluative indicators for the racecourse site selection were derived.

This chapter also briefly introduces Hainan Province and illustrates the reasons for the selection of Haikou, Sanya, Danzhou as candidate cities for the racecourse site selection through the statistical data.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter consists of 4 main parts which are research design, data collection, data analysis and analysis framework. By using the AHP method, prioritize the 6 main evaluative indicators and 22 sub evaluative indicators that affecting the racecourse site selection and evaluate the candidate cities.

3.1 Research Design

The evaluative indicators affecting the racecourse site selection are derived through literature review and the status quo of Hainan Province. These data are collected through a structured questionnaire.

Because of the complexity of the racecourse site selection and the horse racing industry development, which involves the construction of stadiums, the operation of horse racing events, horse racing tourism, horse racing betting and other aspects, which also includes the coordination role of relevant government departments, the data for this study will be collected mainly from relevant government departments, senior practitioners of relevant industries, such as construction practitioners, sports event operation practitioners, tourism practitioners, and relevant scholars. Of course, the data providers for this study also need to have sufficient knowledge of the three candidate cities.

The 6 main evaluative indicators and 22 sub evaluative indicators will be analyzed by using the AHP method, the importance of each evaluative indicator will be given. And by using the AHP method, the suitability of each candidate city will be given.

The results can give opinions of the suitability of each candidate city for the racecourse construction, and the constructed evaluation model will also have a positive

effect on the evaluation of the suitability of other cities to construct racecourses and develop the horse racing industry.

3.2 Data Collection

3.2.1 Population and Sample Size

This topic involves three main parties, i.e., government coordination, venue construction, and post-completion operation. Moreover, since the AHP model does not require many respondents. Therefore, the authors decided to use the non-probabilistic and purposive sampling, collect data from 1 relevant government staff, 2 senior practitioners in venue construction, 2 senior practitioners in related industry operations, and 1 scholar, for a total of 6 people who are familiar with the relevant fields and familiar with the candidate cities.

3.2.2 Questionnaires

After the establishment of the evaluation model for the racecourse site selection, the author created the questionnaire and will distribute them to 1 related government staff, 2 senior practitioners in venue construction, 2 senior practitioners in related industry operations, and 1 scholar, a total of 6 people who are familiar with the relevant fields and familiar with the candidate cities.

The questionnaire in this study was focused on the evaluative indicators' prioritization and the suitability of each candidate city. The questionnaire is shown in the appendix.

Table 3.1 The evaluative indicators of the racecourse site selection

Main evaluative indicator	Sub evaluative indicator
A1: Land acquisition and construction conditions	B11: Land acquisition cost
	B12: Demolition difficulty
	B13: Land supply
	B14: Geological conditions
A2: Personnel	B21: Middle and high-end Personnel
	B22: General labor
A3: Economy	B31: Economic base
	B32: Ability to attract investment
	B33: Spending power
	B34: Horse racing betting potential
A4: Tourism resources	B41: Terrestrial landscape
	B42: Maritime landscape
	B43: Biological landscape
	B44: Cultural attractions
	B45: Climatic conditions
A5: Transportation	B51: Road transportation capacity
	B52: Rail transportation capacity
	B53: Sea transportation capacity
	B54: Air transportation capacity
A6: Facilities and services	B61: Catering and accommodation
	B62: Other facilities and services
	B63: Social security

3.3 Data Analysis

The 6 main evaluative indicators and 22 sub evaluative indicators that affecting the racecourse site selection are derived from the literature review. Data from the structured questionnaires will be analyzed by using the AHP method. Hadadian and Rasoulian (2017) stated that the AHP method is useful for decision-makers to prioritize the evaluative indicators and rank the alternatives. Spreadsheet, YAAHP, MAHP and some other computer software can be used to solve AHP problems. The steps of data analysis are shown below:

Step 1: Establish a pairwise comparison matrix to compare pairwise elements in the hierarchy. The pairwise comparison matrix A and its elements are represented as follows:

$$A = \left[a_{ij}\right] = \begin{bmatrix} 1 & a_{12} & \cdots & a_{1n} \\ a_{21} & 1 & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & 1 \end{bmatrix}$$

Step 2: Calculate eigenvectors (wi), consistency vector (vi) and eigenvalue (λ)

$$W_i = \left(\prod_{j=1}^{n} a_{ij}\right)^{\frac{1}{n}} / \sum_{i=1}^{n} \left(\prod_{j=1}^{n} a_{ij}\right)^{\frac{1}{n}} \quad i, j = 1, 2, 3, \ldots\ldots\ldots \mathrm{n} \tag{3.1}$$

$$v_i = \left(\sum_{j=1}^{n} w_j a_{ij}\right) / w_i \quad i, j = 1, 2, \ldots\ldots, n \tag{3.2}$$

$$\lambda = \frac{\sum_{i=1}^{n} v_i}{n} \qquad i = 1,2,\ldots\ldots\ldots, n \tag{3.3}$$

Step 3: Consistency check

Calculate consistency index (C.I.) and consistency ratio (C.R.)

$$\text{C.I.} = \frac{\lambda - n}{n - 1} \tag{3.4}$$

$$C.R. = \frac{C.I.}{R.I.} \tag{3.5}$$

Step 4: Weight calculation of overall hierarchic evaluative indicators and rank the candidate cities.

3.4 Analysis Framework

Figure 3.1 shows the 6 main evaluative indicators and 22 sub evaluative indicators that affecting the racecourse site selection. Data collected through the questionnaire will be analyzed by using the AHP method. The importance of each evaluative indicator and the suitability of each candidate city will be given.

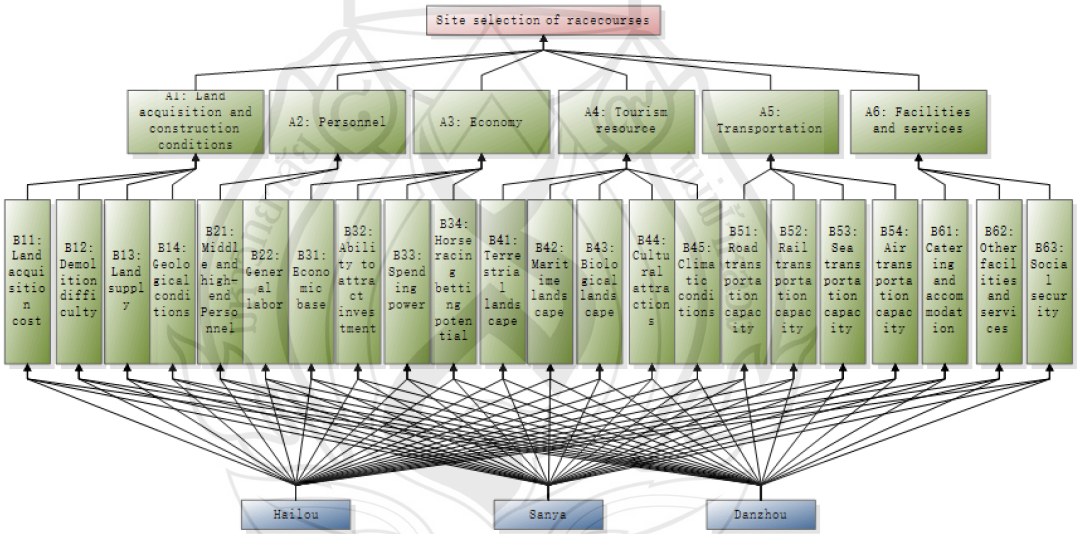

Figure 3.1 Analysis framework

CHAPTER 4

RESULTS

This chapter mainly focuses on the weight calculation of each evaluative indicator affecting the racecourse site selection and the suitability evaluation of the three major cities in Hainan Province for the racecourse construction, by using the AHP method. Data was obtained through the structured questionnaire.

4.1 AHP Results

The purpose of this study is to derive the evaluative indicator affecting racecourses site selection, and to obtain the importance of each evaluative indicator, and using Hainan Province as an example, try to identify the racecourse construction suitability for three major cities in Hainan Province.

Therefore, the questionnaire will be distributed to government staff, senior practitioners and scholars who are familiar with the relevant fields and familiar with the candidate cities.

According to the above principles, this study has distributed the questionnaire to 1 related government staff, 2 senior practitioners in venue construction, 2 senior practitioners in related industry operations, and 1 scholar, for a total of 6 people who are familiar with the relevant fields and familiar with the candidate cities. Information of the respondents is shown in table 4.1.

Table 4.1 Information of the respondents

Category	Gender	Age	Length of involvement in current industry
Government staff	female	30-34	10-14 years
Construction	male	30-34	5-9 years
practitioner	female	40-44	15-19 years
Related industry	male	40-44	20+ years
practitioner	female	55-59	20+years
Scholar	female	30-34	10-14 years

4.1.1 Assigning Weight to the Evaluative Indicators

The questionnaire for the respondent numbered 1 will be used here as an example to illustrate the analysis of the questionnaire. Firstly, we will take the main evaluative indicators from A1: Land acquisition and construction conditions to A6: Facilities and services, as an example, as shown in Table 4.2, to demonstrate the calculation process.

Table 4.2 Main evaluative indicators

Main evaluative indicator
A1: Land acquisition and construction conditions
A2: Personnel
A3: Economy
A4: Tourism resources
A5: Transportation
A6: Facilities and services

Results of the main evaluative indicators part from the respondent numbered 1 are shown in table 4.3.

Table 4.3 Results of the main evaluative indicators part from the respondent numbered 1

Evaluative indicator	**9 8 7 6 5 4 3 2 1 2 3 4 5 6 7 8 9**	**Evaluative indicator**
A1: Land acquisition and construction conditions, A2: Personnel, A3: Economy, A4: Tourism resource, A5: Transportation, A6: Facilities and services		
A1	□ □ □ □ □ □ □ V □ □ □ □ □ □ □ □	A2
A1	□ □ □ □ □ □ □ □ V □ □ □ □ □ □ □ □	A3
A1	□ □ □ □ □ □ □ □ □ □ □ □ V □ □ □ □	A4
A1	□ □ □ □ □ □ □ □ □ □ V □ □ □ □ □ □	A5
A1	□ □ □ □ □ □ □ □ □ □ □ □ □ V □ □ □	A6
A2	□ □ □ □ □ □ □ □ V □ □ □ □ □ □ □ □	A3
A2	□ □ □ □ □ □ □ □ □ □ V □ □ □ □ □ □	A4
A2	□ □ □ □ □ □ □ □ □ □ V □ □ □ □ □ □	A5
A2	□ □ □ □ □ □ □ □ □ □ V □ □ □ □ □ □	A6
A3	□ □ □ □ □ □ □ □ □ □ V □ □ □ □ □ □	A4
A3	□ □ □ □ □ □ □ □ □ V □ □ □ □ □ □ □	A5
A3	□ □ □ □ □ □ □ □ □ V □ □ □ □ □ □ □	A6
A4	□ □ □ □ □ □ □ □ □ V □ □ □ □ □ □ □	A5
A4	□ □ □ □ □ □ □ □ □ V □ □ □ □ □ □ □	A6
A5	□ □ □ □ □ □ □ □ □ V □ □ □ □ □ □ □	A6

4.1.1.1 Step 1: Establish a pairwise comparison matrix to compare pairwise elements in the hierarchy.

From the above questionnaire, we can obtain the pairwise comparison, as shown in table 4.4.

Table 4.4 Pairwise comparison from A1: Land acquisition and construction conditions to A6: Facilities and services

Main evaluative indicator	A1	A2	A3	A4	A5	A6
A1	1	2	1	1/5	1/3	1/6
A2	1/2	1	1	1/3	1/2	1/3
A3	1	1	1	1/3	1	1
A4	5	3	3	1	1	1
A5	3	2	1	1	1	1
A6	6	3	1	1	1	1

4.1.1.2 Step 2: Calculate eigenvectors (Wi), consistency vector (v_i) and eigenvalue (λ)

According to formula (3.1),

W_{A1}=(1*2*1*1/5*1/3*1/6)^1/6/{(1*2*1*1/5*1/3*1/6)^1/6+(1/2*1*1*1/3*1/2*1/3)^1/6+(1*1*1*1/3*1*1)^1/6+(5*3*3*1*1*1)^1/6+(3*2*1*1*1*1)^1/6+(6*3*1*1*1*1)^1/6}=0.078

W_{A2}=(1/2*1*1*1/3*1/2*1/3)^1/6/{(1*2*1*1/5*1/3*1/6)^1/6+(1/2*1*1*1/3*1/2*1/3)^1/6+(1*1*1*1/3*1*1)^1/6+(5*3*3*1*1*1)^1/6+(3*2*1*1*1*1)^1/6+(6*3*1*1*1*1)^1/6}=0.081

W_{A3}=(1*1*1*1/3*1*1)^1/6/{(1*2*1*1/5*1/3*1/6)^1/6+(1/2*1*1*1/3*1/2*1/3)^1/6+(1*1*1*1/3*1*1)^1/6+(5*3*3*1*1*1)^1/6+(3*2*1*1*1*1)^1/6+(6*3*1*1*1*1)^1/6}=0.123

W_{A4}=(5*3*3*1*1*1)^1/6/{(1*2*1*1/5*1/3*1/6)^1/6+(1/2*1*1*1/3*1/2*1/3)^1/6+(1*1*1*1/3*1*1)^1/6+(5*3*3*1*1*1)^1/6+(3*2*1*1*1*1)^1/6+(6*3*1*1*1*1)^1/6}=0.279

W_{A5}=(3*2*1*1*1*1)^1/6/{(1*2*1*1/5*1/3*1/6)^1/6+(1/2*1*1*1/3*1/2*1/3)^1/6+(1*1*1*1/3*1*1)^1/6+(5*3*3*1*1*1)^1/6+(3*2*1*1*1*1)^1/6+(6*3*1*1*1*1)^1/6}=0.199

W_{A6}=(6*3*1*1*1*1)^1/6/{(1*2*1*1/5*1/3*1/6)^1/6+(1/2*1*1*1/3*1/2*1/3)^1/6+(1*1*1*1/3*1*1)^1/6+(5*3*3*1*1*1)^1/6+(3*2*1*1*1*1)^1/6+(6*3*1*1*1*1)^1/6}=0.239

According to formula (3.2),

V_{A1}=
(1*0.078+2*0.081+1*0.123+1/5*0.279+1/3*0.199+1/6*0.239)/0.078=6.714

V_{A2}=
(1/2*0.078+1*0.081+1*0.123+1/3*0.279+1/2*0.199+1/3*0.239)/0.081=6.343

V_{A3}=
(1*0.078+1*0.081+1*0.123+1/3*0.279+1*0.199+1*0.239)/ 0.123=6.616

V_{A4}=
(5*0.078+3*0.081+3*0.123+1*0.279+1*0.199+1*0.239)/ 0.279=6.179

V_{A5}=
(3*0.078+2*0.081+1*0.123+1*0.279+1*0.199+1*0.239)/ 0.199=6.214

V_{A6}=
(6*0.078+3*0.081+1*0.123+1*0.279+1*0.199+1*0.239)/ 0.239=6.497

According to formula (3.3)

λ = (6.714+6.343+6.616+6.179+6.214+6.497)/6=6.427

4.1.1.3 Step 3: Consistency check

Calculate consistency ratio (C.R.) and consistency index (C.I.)

According to formula (3.4)

C.I.= (6.427-6)/ (6-1) =0.085

According to table 2.2

R.I.=1.24

According to formula (3.5)

C.R.=0.085/1.24=0.069

Since 0.069 is less than 0.1, the consistency of main evaluative indicators can be considered valid.

From this, we can get the weight of each main evaluative indicator assigned by the respondent numbered 1, as shown in table 4.5.

Table 4.5 Weight of each main evaluative indicator assigned by the respondent numbered 1

Main evaluative indicator	Weight	C.R.
A1: Land acquisition and construction conditions	0.078	0.069
A2: Personnel	0.081	
A3: Economy	0.123	
A4: Tourism resources	0.279	
A5: Transportation	0.199	
A6: Facilities and services	0.239	

The calculation process for each sub evaluative indicator is exactly the same as the calculation process for the main evaluative indicators, Therefore, the author will not elaborate the calculation process step by step here.

With the help of Excel, YAAHP, MAHP or some other software, the calculation process does not need to be manually calculated. In this paper, the authors used Excel to perform calculations. Through the calculation of each sub evaluative indicator assigned by the respondent numbered 1, the weight of each sub evaluative indicator assigned by the respondent numbered 1can be obtained, as shown in table 4.6.

Table 4.6 Inner-weight of each sub evaluative indicator assigned by the respondent numbered 1

Sub evaluative indicator	Inner-weight	C.R.
B11: Land acquisition cost	0.151	
B12: Demolition difficulty	0.370	0.030
B13: Land supply	0.199	
B14: Geological conditions	0.281	
B21: Middle and high-end Personnel	0.667	0.000
B22: General labor	0.333	
B31: Economic base	0.132	
B32: Ability to attract investment	0.300	0.057
B33: Spending power	0.173	
B34: Horse racing betting potential	0.395	
B41: Terrestrial landscape	0.198	
B42: Maritime landscape	0.123	
B43: Biological landscape	0.131	0.070
B44: Cultural attractions	0.215	
B45: Climatic conditions	0.333	
B51: Road transportation capacity	0.350	
B52: Rail transportation capacity	0.294	0.043
B53: Sea transportation capacity	0.091	
B54: Air transportation capacity	0.266	
B61: Catering and accommodation	0.200	
B62: Other facilities and services	0.200	0.000
B63: Social security	0.200	

It can be seen from Table 4.6 that the C.R. value of each section of this respondent is less than 0.1, so all sections of this respondent's questionnaire are

consistent and the questionnaire is valid. Then integrate table 4.5 and table 4.6 we can get table 4.7.

Table 4.7 Weight of each main evaluative indicator and inner-weight of each sub evaluative indicator assigned by the respondent numbered 1

Main evaluative indicator	Weight	Sub evaluative indicator	Inner-weight
A1: Land acquisition and construction conditions	0.078	B11: Land acquisition cost	0.151
		B12: Demolition difficulty	0.370
		B13: Land supply	0.199
		B14: Geological conditions	0.281
A2: Personnel	0.081	B21: Middle and high-end Personnel	0.667
		B22: General labor	0.333
A3: Economy	0.123	B31: Economic base	0.132
		B32: Ability to attract investment	0.300
		B33: Spending power	0.173
		B34: Horse racing betting potential	0.395
A4: Tourism resources	0.279	B41: Terrestrial landscape	0.198
		B42: Maritime landscape	0.123
		B43: Biological landscape	0.131
		B44: Cultural attraction	0.215
		B45: Climatic conditions	0.333
A5: Transportation	0.199	B51: Road transportation capacity	0.349
		B52: Rail transportation capacity	0.294
		B53: Sea transportation capacity	0.091
		B54: Air transportation capacity	0.266
A6: Facilities and services	0.239	B61: Catering and accommodation	0.200
		B62: Other facilities and services	0.200
		B63: Social security	0.600

According to the same method, the data from the remaining 5 respondents were calculated, and during the calculation, the C.R. values of a total of 5 sections for 3 of the respondents were found to fail to meet the C.R. values less than 0.1. After adjustment to make the C.R. less than 0.1, the questionnaires of these 3 respondents were recalculated.

After sorting, the weight assigned individually by the 6 respondents on each main evaluative indicator is shown in table 4.8, the inner-weight assigned individually by the 6 respondents on each sub evaluative indicator is shown in table 4.9.

Table 4.8 Weight of each main evaluative indicator assigned by the respondents

Weight of main evaluative indicator	**Number of respondents**					
	1	**2**	**3**	**4**	**5**	**6**
A1	0.078	0.020	0.057	0.165	0.103	0.150
A2	0.081	0.227	0.053	0.131	0.108	0.408
A3	0.123	0.350	0.401	0.208	0.149	0.312
A4	0.279	0.111	0.344	0.165	0.133	0.064
A5	0.199	0.143	0.123	0.165	0.133	0.041
A6	0.239	0.150	0.022	0.165	0.374	0.024

Table 4.9 Inner-weight of each sub evaluative indicator assigned by the respondents

Inner-weight of sub evaluative indicator	Number of respondents					
	1	**2**	**3**	**4**	**5**	**6**
B11	0.151	0.200	0.302	0.361	0.074	0.405
B12	0.370	0.200	0.603	0.065	0.318	0.149
B13	0.199	0.200	0.047	0.326	0.551	0.211
B14	0.281	0.400	0.047	0.248	0.056	0.234
B21	0.667	0.500	0.900	0.750	0.074	0.111
B22	0.333	0.500	0.100	0.250	0.318	0.889
B31	0.132	0.552	0.058	0.250	0.211	0.549
B32	0.300	0.179	0.082	0.250	0.086	0.303
B33	0.173	0.184	0.117	0.250	0.234	0.096
B34	0.395	0.085	0.742	0.250	0.468	0.053
B41	0.198	0.163	0.134	0.276	0.390	0.036
B42	0.123	0.163	0.363	0.026	0.085	0.063
B43	0.131	0.142	0.253	0.048	0.085	0.201
B44	0.215	0.107	0.086	0.150	0.346	0.333
B45	0.333	0.425	0.163	0.500	0.095	0.367
B51	0.349	0.498	0.236	0.603	0.347	0.573
B52	0.294	0.195	0.311	0.118	0.102	0.148
B53	0.091	0.061	0.066	0.118	0.102	0.212
B54	0.266	0.246	0.387	0.161	0.449	0.067
B61	0.200	0.149	0.135	0.333	0.333	0.567
B62	0.200	0.066	0.367	0.333	0.333	0.357
B63	0.600	0.785	0.498	0.333	0.333	0.075

When the individually assigned weight of each evaluative indicator by the 6 respondents is obtained, the final weight of each evaluative indicator can be found by applying the geometric mean method.

Here, the individually assigned weight of the main evaluative indicator by the 6 respondents will be taken as an example to show the process of the final weight calculation. According to table 4.8 and the formula for calculating geometric mean, the calculation process is as follows.

$G_{A1=}$ (0.078*0.020*0.057*0.165*0.103*0.150) ^$^{1/6}$=0.078

$G_{A2=}$ (0.081*0.227*0.053*0.131*0.108*0.408) ^$^{1/6}$=0.134

$G_{A3=}$ (0.123*0.350*0.401*0.208*0.149*0.312) ^$^{1/6}$=0.235

$G_{A4=}$ (0.279*0.111*0.344*0.165*0.133*0.064) ^$^{1/6}$=0.157

$G_{A5=}$ (0.199*0.143*0.123*0.165*0.133*0.041) ^$^{1/6}$=0.121

$G_{A6=}$ (0.239*0.150*0.022*0.165*0.374*0.024) ^$^{1/6}$=0.103

And the final weight of each main evaluative indicator are as follows.

Final weight of A_1=0.078/ (0.078+0.134+0.235+0.157+0.121+0.103) =0.094

Final weight of A_2=0.134/ (0.078+0.134+0.235+0.157+0.121+0.103) =0.161

Final weight of A_3=0.235/ (0.078+0.134+0.235+0.157+0.121+0.103) =0.284

Final weight of A_4=0.157/ (0.078+0.134+0.235+0.157+0.121+0.103) =0.190

Final weight of A_5=0.121/ (0.078+0.134+0.235+0.157+0.121+0.103) =0.147

Final weight of A_6=0.103/ (0.078+0.134+0.235+0.157+0.121+0.103) =0.124

Table 4.10 showed the final weight of each main evaluative indicator.

Table 4.10 Final weight of each main evaluative indicator

Main evaluative indicator	Final weight
A1	0.094
A2	0.162
A3	0.284
A4	0.190
A5	0.147
A6	0.124

According to the same method, the final inner-weight of each sub evaluative indicator can be obtained. The results are shown in Table 4.11.

Table 4.11 Final inner-weight of each sub evaluative indicator

Sub evaluative indicator	Final inner-weight
B11	0.266
B12	0.282
B13	0.253
B14	0.200
B21	0.665
B22	0.335
B31	0.280
B32	0.220
B33	0.209
B34	0.291
B41	0.191
B42	0.119
B43	0.149
B44	0.216
B45	0.324
B51	0.452
B52	0.195
B53	0.108
B54	0.244
B61	0.298
B62	0.284
B63	0.418

Finally, by integrating table 4-10 and table 4-11, the weight and ranking of each main evaluative indicator and the inner-weight, total weight and ranking of each sub evaluative indicator can be obtained, as shown in table 4.12.

Table 4.12 Final weight and ranking of each evaluative indicator

Main evaluative indicator	Weight	Weight ranking	Sub evaluative indicator	Inner-weight	Total weight	Total weight ranking
A1: Land acquisition and construction conditions	0.094	6	B11: Land acquisition cost	0.266	0.025	18
			B12: Demolition difficulty	0.281	0.027	17
			B13: Land supply	0.253	0.024	19
			B14: Geological conditions	0.200	0.019	21
A2: Personnel	0.161	3	B21: Middle and high-end Personnel	0.665	0.107	1
			B22: General labor	0.335	0.054	8
A3: Economy	0.284	1	B31: Economic base	0.280	0.080	3
			B32: Ability to attract investment	0.220	0.062	5
			B33: Spending power	0.209	0.059	7
			B34: Horse racing betting potential	0.291	0.083	2
A4: Tourism resources	0.190	2	B41: Terrestrial landscape	0.191	0.036	12
			B42: Maritime landscape	0.119	0.023	20
			B43: Biological landscape	0.149	0.028	16
			B44: Cultural attraction	0.216	0.041	10
			B45: Climatic conditions	0.325	0.062	6
A5: Transportation	0.146	4	B51: Road transportation capacity	0.425	0.066	4
			B52: Rail transportation capacity	0.195	0.029	15
			B53: Sea transportation capacity	0.108	0.016	22
			B54: Air transportation capacity	0.244	0.036	13
A6: Facilities and services	0.124	5	B61: Catering and accommodation	0.298	0.037	11
			B62: Other facilities and services	0.284	0.035	14
			B63: Social security	0.418	0.052	9

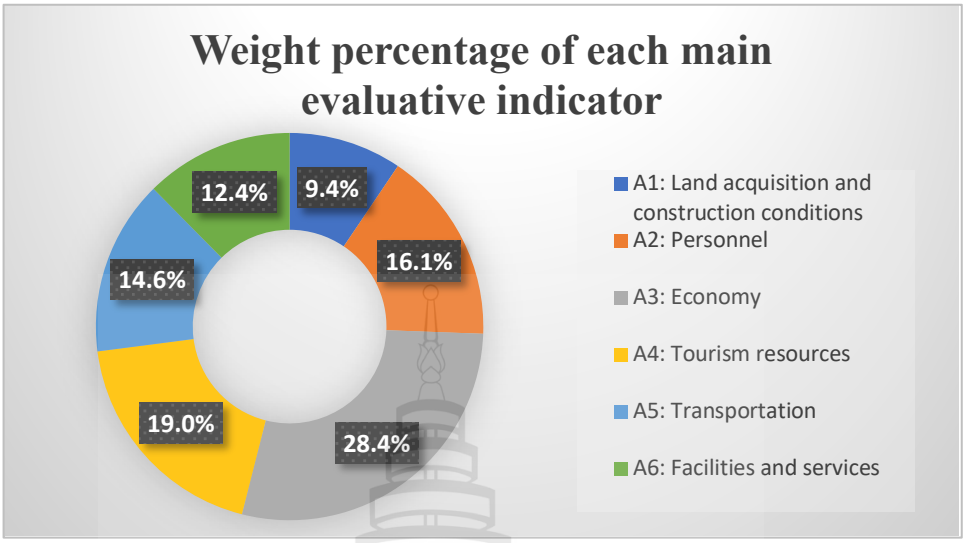

Figure 4.1 Weight percentage of each main evaluative indicator

4.1.2 Assigning Points to Candidate Cities

Once the weight of each evaluative indicator is obtained, we can start to calculate the points of each evaluative indicator for each candidate city, as well as the total points of these candidate cities.

The calculation process is exactly the same as the calculation of the weight of each evaluative indicator, so the author will not repeat it here. The point of each evaluative indicator of each candidate city and the total points of each candidate city is shown in table 4.13.

Table 4.13 Points of each evaluative indicator and total points of each candidate city

Evaluative indicator	Haikou	Sanya	Danzhou
B11: Land acquisition cost	0.010	0.005	0.011
B12: Demolition difficulty	0.011	0.005	0.011
B13: Land supply	0.006	0.004	0.014
B14: Geological conditions	0.008	0.007	0.004
B21: Middle and high-end Personnel	0.069	0.031	0.007
B22: General labor	0.033	0.018	0.003
B31: Economic base	0.049	0.026	0.005
B32: Ability to attract investment	0.033	0.025	0.004
B33: Spending power	0.027	0.027	0.005
B34: Horse racing betting potential	0.027	0.050	0.006
B41: Terrestrial landscape	0.011	0.022	0.003
B42: Maritime landscape	0.003	0.017	0.002
B43: Biological landscape	0.015	0.009	0.005
B44: Cultural attraction	0.024	0.008	0.008
B45: Climatic conditions	0.015	0.032	0.015
B51: Road transportation capacity	0.034	0.026	0.006
B52: Rail transportation capacity	0.013	0.011	0.004
B53: Sea transportation capacity	0.007	0.007	0.002
B54: Air transportation capacity	0.016	0.017	0.003
B61: Catering and accommodation	0.019	0.015	0.004
B62: Other facilities and services	0.018	0.015	0.003
B63: Social security	0.032	0.014	0.006
Total points	0.479	0.391	0.129

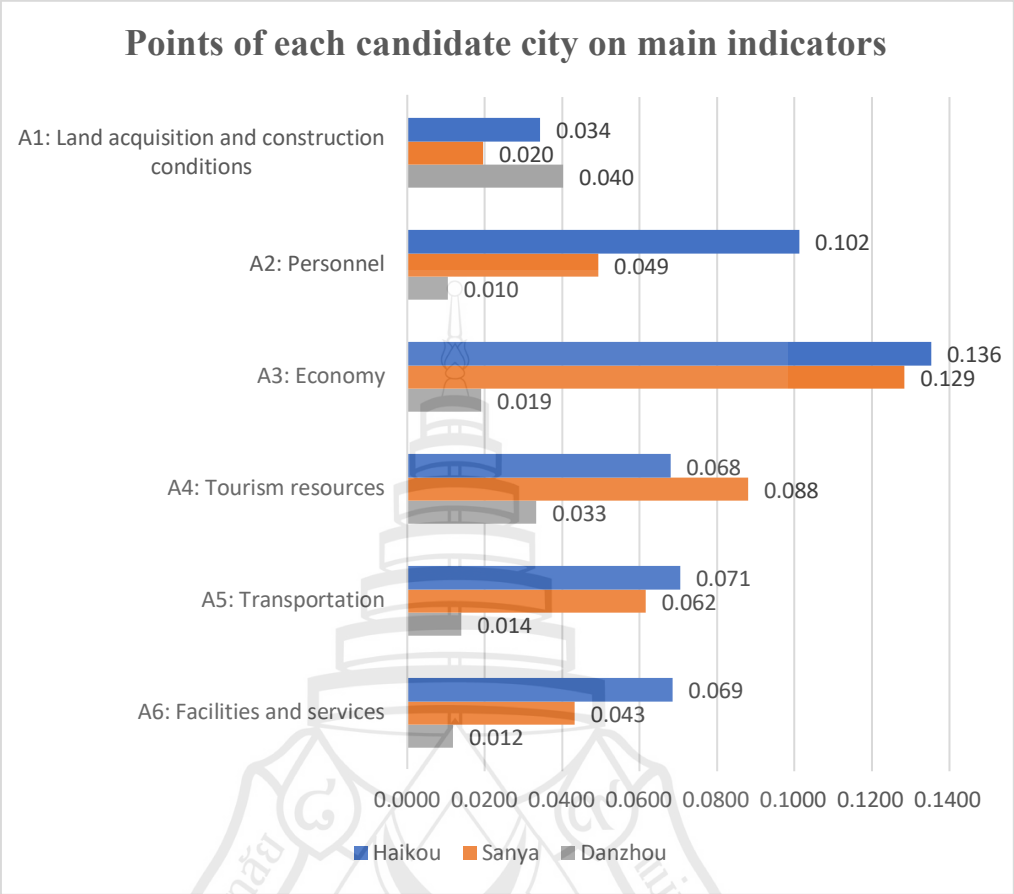

Figure 4.2 Points of each candidate city on main indicators

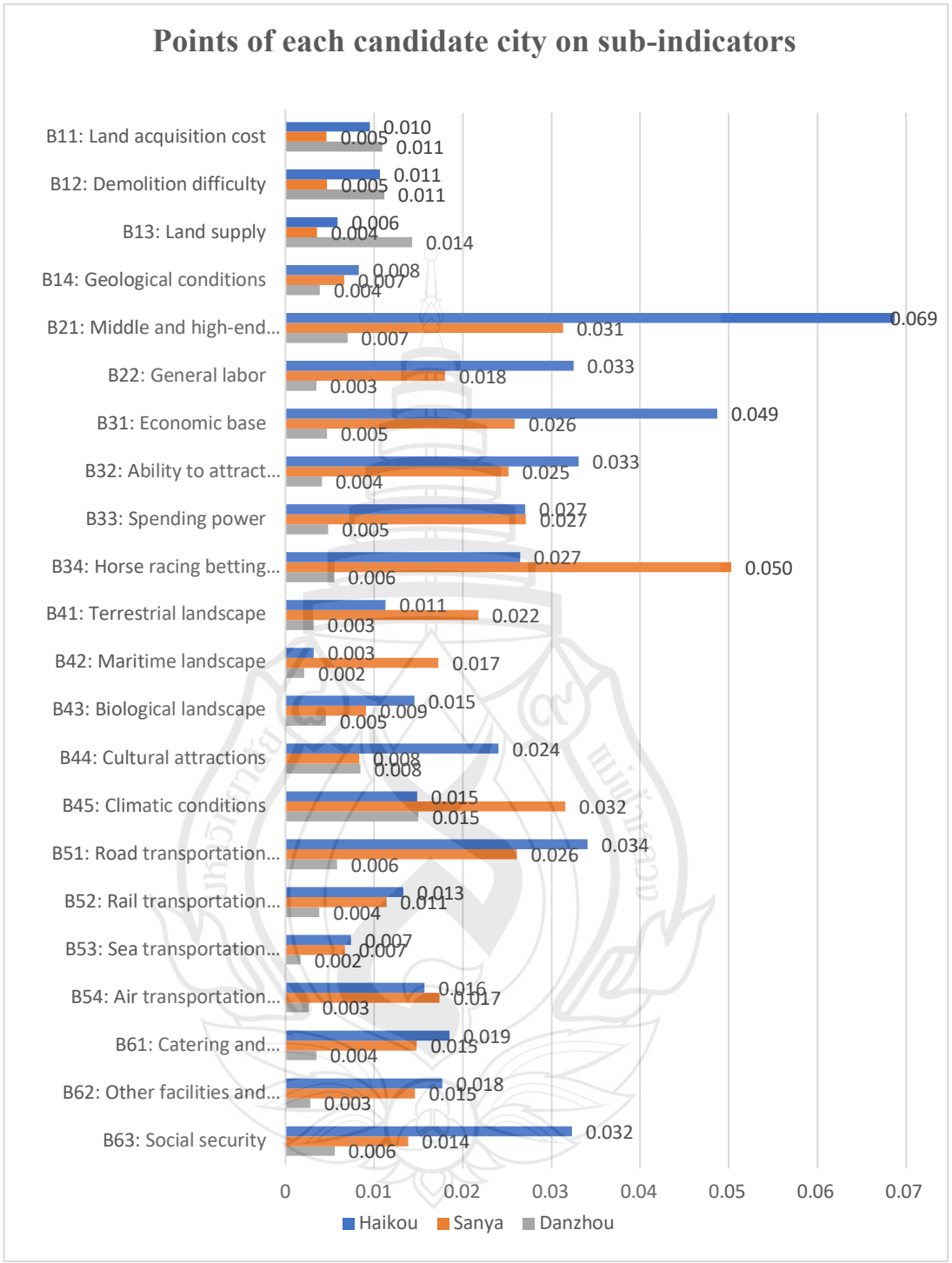

Figure 4.3 Points of each candidate city on sub-indicators

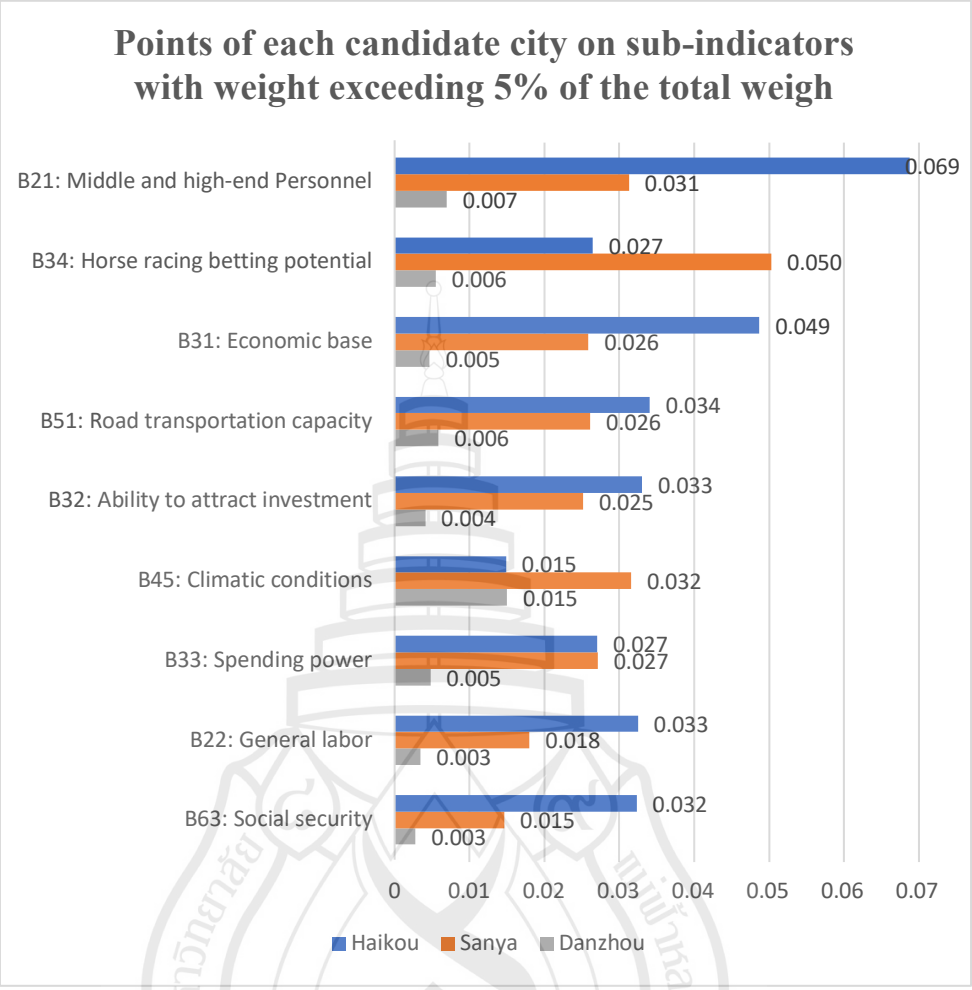

Figure 4.4 Points of each candidate city on sub-indicators with weight exceeding 5% of the total weight (In descending order of the weight)

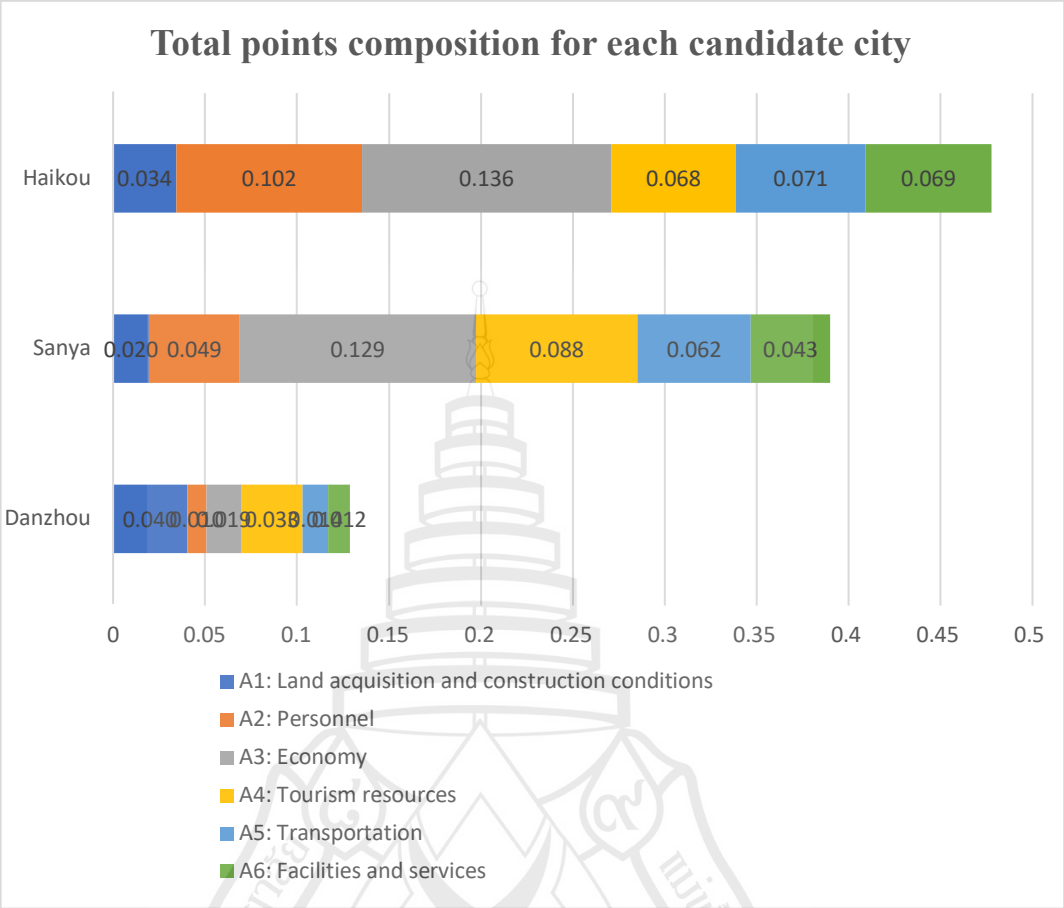

Figure 4.5 Total points composition for each candidate city

4.2 Summary

4.2.1 Weight of Each Main Evaluative Indicator

As shown in Figure 4.1, according to the results of the questionnaires returned, the most important indicator affecting the racecourse site selection is A3: Economy, which is nearly 30% of the overall importance, and its importance is far higher than the other 5 main indicators. The second most important indicator after A3 is A4: Tourism Resources, which accounts for about 20% of the total. The middle 2 in importance are A2: Personnel and A5: Transportation, whose importance is 16% and 15% respectively. A6: Facilities and services, and A1: Land acquisition and construction conditions are in the last 2 positions, with 12% and 10% importance, respectively.

4.2.2 A1: Land Acquisition and Construction Conditions

As shown in Figure 4.2 Danzhou scored the highest in this category, which is also the only category of the 6 main evaluative indicators that Danzhou occupies the first place, while in the other 5 main indicators, Danzhou all ranked the third, and the gap between the top 2 is huge. Haikou is in the second place in this category, and the gap with Danzhou is not large, while Sanya is at the bottom, and the point is relatively low compared with the top 2.

According to Figure 4.3, the leading of Danzhou in this category can also be seen from the sub evaluative indicators, except for B14: Geological conditions, where Haikou get the higher point, in the other 3 evaluative indicators, Danzhou are in the first place, especially B13: land supply, Danzhou has a huge advantage.

4.2.3 A2: Personnel

As shown in Figure 4.2 Haikou has a huge advantage in this category, getting nearly two-thirds of the total points. Sanya received about half the points of Haikou. While Danzhou scored the lowest, the point is only one-tenth of Haikou and one-fifth of Sanya, is at a complete disadvantage, no competitive ability.

According to Figure 4.3, from the sub evaluative indicators, In B1: Middle and high-end personnel, Haikou has a clear advantage over Sanya, scoring more than twice as much as Sanya, while in B2: General laborers, Haikou also has a clear advantage, although it is somewhat smaller compared to B1. This seems to be in line with the common understanding of ordinary people, because Haikou is the capital of Hainan Province, the political and commercial center of Hainan Province, and naturally has an overwhelming advantage in the province in terms of middle and high-end personnel.

4.2.4 A3: Economy

As shown in Figure 4.2, Haikou occupies the first place in this category, Sanya occupies the second place, but the gap between this two is minimal, while Danzhou is in the third place, with a huge gap between the first two.

According to Figure 4.3, from the sub evaluative indicators, in B31: Economic base, Haikou has a greater advantage over Sanya, in B32: Ability to attract investment, Haikou has a smaller advantage over Sanya, in B33: Spending power, both points are

almost identical, in B34: horse racing betting potential, Sanya has a greater advantage over Haikou, so after adding up, the difference between the two is slight, with Haikou slightly ahead.

4.2.5 A4: Tourism Resources

As shown in Figure 4.2, In this category Sanya occupies the first place with a small advantage, which is the only main evaluative indicator that Sanya occupies the first place, in the other 5 main evaluative indicators, Sanya comes in the second place in 4 of them, comes in the third place in 1 of them. In the third place, Danzhou, the gap with the top 2 is still relatively large.

According to Figure 4.3, From the sub evaluative indicators, Sanya's advantage comes mainly from B41: Terrestrial landscape, B42: Maritime landscape and B45: Climatic conditions. Among them, the most obvious advantage is B2: marine landscape and B45: Climatic conditions. Haikou, on the other hand, is leading in B3: Biological Landscape, and B4: Cultural attractions.

4.2.6 A5: Transportation

As shown in Figure 4.2, Similar to A3: Economy, Haikou and Sanya are in the first and second position, with a small gap between each other; while Danzhou is in the third position, and has a huge gap with the first 2.

According to Figure 4.3, From the sub evaluative indicators, in this category, the most important indicator for the 6 respondents is B51: road transportation capacity, and in B51: road transportation capacity, Haikou has certain advantages compared with Sanya, while in the remaining three items, B52: Rail transportation capacity, B53: Sea transportation capacity and B54: Air transportation capacity, Haikou and Sanya have almost the same points.

4.2.7 A6: Facilities and Services

As shown in Figure 4.2, in this main evaluative indicator, Haikou occupies the first place, getting more than 50% of the total points, Sanya occupies the second place, its gap with Haikou is relatively large, Danzhou is still the lowest, and the gap with Hainan and Sanya is huge.

According to Figure 4.3, on B61: Catering and accommodation and B62: Other facilities and services, Haikou has a small lead over Sanya, but in B63: Social Security, Haikou has a huge advantage, scoring more than twice as much as Sanya.

4.2.8 Summary

As shown in Figure 4.3, Haikou received the highest with 0.479 points. Sanya received the second-highest with 0.391 points and Danzhou ranked third with 0.129, with a large gap between the top two.

For Haikou, it ranks first in A2: Personnel, A3: Economy, A5: Transportation, and A6: Facilities and services, and second in A1: Land acquisition and construction conditions, and A4: Tourism resources. In all 6 main evaluative indicators, each of which Haikou received relatively high points, there were no obvious shortcomings. Therefore, Haikou, the capital of the province, is an ideal city for racecourse construction and the horse racing industry development.

For Sanya, it ranks first in A4: Tourism resource, second in A2: Personnel, A3: Economy, A5: Transportation, and A6: Facilities and services, and third in A1: Land acquisition and construction conditions. Although 4 main evaluative indicators are in the second place, the gap between Sanya and Haikou is very small in A3: Economy and A5: Transportation, shortcomings of Sanya are mainly in A2: Personnel, and A6: Facilities and services.

As shown in Figure 4.4, in the most important 9 sub-indicators, Haikou is not the overall leader, but Sanya is in the lead in B34: Horse racing betting potential and B45: Climate conditions. Its gap with Haikou mainly exists in B21: Middle and high-end personnel, B31: Economic base, B22: General labor, and B63: Social security. If Sanya can make up for its shortcomings in personnel and social security, Sanya is still a suitable city for racecourse construction and the horse racing industry development.

On the Danzhou side, it ranks first in A1: Land acquisition and construction conditions, and third in A2: Personnel, A3: Economy, A4: Tourism resources, A5: Transportation, and A6: Facilities and services. Its total point is the lowest and there is a large gap with the top 2. Except for A1: Land acquisition and construction conditions, the remaining 5 main evaluative indicators are at an overall disadvantage, so it can be said that except for easy acquisition of land and cheap land price, there is no other

advantage. Therefore, to make up for the shortcomings, related personnel have to invest huge resources, spend a lot of time and face a high risk of failure. Therefore, it is not recommended to choose Danzhou as the place of racecourse construction and the horse racing industry development.

CHAPTER 5

CONCLUSION

5.1 Introduction

In summary, this study focuses on the derivation and prioritization of the evaluative indicators that affecting the racecourse site selection, and evaluate the suitability of the racecourse construction in three major cities in Hainan Province, China, as an example.

The main objective of this study was to derive and prioritize the evaluative indicators that affecting the racecourse site selection. With purposive sampling, data were collected by using structured questionnaires from 1 related government staff, 2 senior practitioners in venue construction, 2 senior practitioners in related industry operations, and 1 scholar, for a total of 6 people who are familiar with the relevant fields and familiar with the candidate cities. The prioritization of the evaluative indicators and the evaluation of the candidates was based on the AHP method.

5.2 Addressing the Research Objectives

5.2.1 The Important Evaluative Indicators Affecting the Racecourse Site Selection and the Weight of Each Evaluative Indicator

Based on extensive literature reading and the status quo of Hainan Province, the author selected 6 main evaluative indicators and 22 sub evaluative indicators. Then the AHP method was used to evaluate the weight of each evaluative indicator through the scoring of 6 respondents, as shown in table 5.1and table 5.2.

Table 5.1 Weight and ranking of each main evaluative indicator (In descending order of the weight)

Main evaluative indicator	Weight	Ranking
A3: Economy	0.284	1
A4: Tourism resources	0.190	2
A2: Personnel	0.161	3
A5: Transportation	0.146	4
A6: Facilities and services	0.124	5
A1: Land acquisition and construction conditions	0.094	6

Table 5.2 Weight and ranking of each sub evaluative indicator (In descending order of the weight)

Sub evaluative indicator	Total weight	Ranking
B21: Middle and high-end Personnel	0.107	1
B34: Horse racing betting potential	0.083	2
B31: Economic base	0.080	3
B51: Road transportation capacity	0.066	4
B32: Ability to attract investment	0.062	5
B45: Climatic conditions	0.062	6
B33: Spending power	0.059	7
B22: General labor	0.054	8
B63: Social security	0.052	9
B44: Cultural attractions	0.041	10
B61: Catering and accommodation	0.037	11
B41: Terrestrial landscape	0.036	12
B54: Air transportation capacity	0.036	13
B62: Other facilities and services	0.035	14
B52: Rail transportation capacity	0.029	15
B43: Biological landscape	0.028	16
B12: Demolition difficulty	0.027	17
B11: Land acquisition cost	0.025	18
B13: Land supply	0.024	19
B42: Maritime landscape	0.023	20
B14: Geological conditions	0.019	21
B53: Sea transportation capacity	0.016	22

It can be seen in terms of the main evaluative indicators, respondents place more importance on A3: Economy, as well as A4: Tourism resources, and less on A6: Facilities and services, and A1: Land acquisition and construction conditions.

In terms of the sub evaluative indicators, respondents place more importance on B21: Middle and high-end Personnel, B34: Horse racing betting potential, B31: Economic base, B51: Road transportation capacity, B32: Ability to attract investment, B45: Climatic conditions and less on B13: Land supply, B42: Maritime landscape, B14: Geological conditions, B53: Sea transportation capacity.

5.2.2 The Suitable Cities in Hainan Province for the Racecourse Construction

The questionnaires from 6 respondents were analyzed by using the AHP method and the following results were obtained, as shown in table 5.3

Table 5.3 Points and ranking of each candidate city on each sub evaluative indicator (In descending order of the evaluative indicators' weight)

Evaluative indicator	Haikou		Sanya		Danzhou	
	Points	Ranking	Points	Ranking	Points	Ranking
B21: Middle and high-end Personnel	0.069	1	0.031	2	0.007	3
B34: Horse racing betting potential	0.027	2	0.050	1	0.006	3
B31: Economic base	0.049	1	0.026	2	0.005	3
B51: Road transportation capacity	0.034	1	0.026	2	0.006	3
B32: Ability to attract investment	0.033	1	0.025	2	0.004	3
B45: Climatic conditions	0.015	3	0.032	1	0.015	2
B33: Spending power	0.027	2	0.027	1	0.005	3
B22: General labor	0.033	1	0.018	2	0.003	3
B63: Social security	0.032	1	0.014	2	0.006	3
B44: Cultural attractions	0.024	1	0.008	3	0.008	2
B61: Catering and accommodation	0.019	1	0.015	2	0.004	3
B41: Terrestrial landscape	0.011	2	0.022	1	0.003	3

Table 5.3 (continued)

Evaluative indicator	Haikou		Sanya		Danzhou	
	Points	Ranking	Points	Rangking	Points	Rangking
B54: Air transportation capacity	0.016	2	0.017	1	0.003	3
B62: Other facilities and services	0.018	1	0.015	2	0.003	3
B52: Rail transportation capacity	0.013	1	0.011	2	0.004	3
B43: Biological landscape	0.015	1	0.009	2	0.005	3
B12: Demolition difficulty	0.011	2	0.005	3	0.011	1
B11: Land acquisition cost	0.010	2	0.005	3	0.011	1
B13: Land supply	0.006	2	0.004	3	0.014	1
B42: Maritime landscape	0.003	2	0.017	1	0.002	3
B14: Geological conditions	0.008	1	0.007	2	0.004	3
B53: Sea transportation capacity	0.007	1	0.007	2	0.002	3
Total points	0.479	1	0.391	2	0.129	3

As shown in table 5.3, Haikou and Sanya are basically in the first or second position in each sub evaluative indicator. After summing up the points, Haikou received the highest with 0.479 points. Sanya received the second-highest with 0.391 points, which is not a big difference with Haikou, and in several important indicators such as B34: horse racing betting potential, Sanya has a clear advantage over Haikou.

Therefore, the author believes that if Hainan Province decides to build a racecourse and develop the horse racing industry, then both Haikou and Sanya are suitable cities. While Danzhou with a total point of 0.129, is far inferior to Haikou and Sanya in most aspects, so it is not recommended to construct a racecourse and develop the horse racing industry in Danzhou.

5.3 Recommendation and Limitation

5.3.1 Recommendation

From Figure 4.4 and Table 5.3, it can be seen that Haikou's points in most evaluative indicators are in the first place of the 3 cities, and it seems that Haikou is the most suitable city to build a racecourse and develop a horse racing industry. However, on the second most important indicator B34: Horse racing betting potential, Haikou is in the second place and has a huge gap with Sanya, which indicates that if the Chinese government confirms to open up the horse racing betting, it may be that Sanya is a more ideal city for the racecourse construction and the horse racing industry development compared to Haikou. Conversely, if the Chinese government does not intend to open up horse racing betting, there is no doubt that Haikou is the most suitable city for racecourse construction and the horse racing industry development.

If Sanya is chosen as the city for the racecourse construction, it should make up for the deficiencies in B21: Middle and high-end Personnel, B31: Economic base, B22: General labor, and B63: Social security to make better development of the horse racing industry.

Danzhou ranks third among the three cities in almost all the important evaluative indicators and has a huge gap with the top two, scoring high in only a few indicators that experts consider less important, so it is not recommended that Danzhou be selected as the city to build a racecourse or develop a horse racing industry.

5.3.2 Limitation

Although the horse racing industry belongs to the sports industry, and racecourse site selection also belongs to the large sports venues site selection. However, the horse racing industry and racecourses also have their special characteristics. Therefore, this study focused on the indicators related to the horse racing industry and racecourses only, the derived indicators in this paper do not apply to other large sports venues site selection. For other cases, the reseachers should not directly copy the evaluative indicators from here but should select the indicators that are more suitable for their cases.

REFERENCES

REFERENCES

Agarwal, A., Shankar, R., & Tiwari, M. K. (2006). Modeling the metrics of lean, agile and leagile supply chain: An ANP-based approach. *European Journal of Operational Research, 173*(1), 211-225.

Al-Harbi, K. M. A. S. (2001). Application of the AHP in project management. *International Journal of Project Management, 19*(1), 19-27.

American Gaming Association (AGA). (2013). *State of the states: The AGA survey of casino entertainment.* Washington, DC: American Gaming Association.

Animal Husbandry Department of Xinjiang Uygur Autonomous Region. (2016). Xinjiang Horse Industry Development Report. *Xinjian XuMuYe, 2016*(9), 8-33.

Aragonés-Beltrán, P., Chaparro-González, F., Pastor-Ferrando, J. P., & Rodríguez-Pozo, F. (2010). An ANP-based approach for the selection of photovoltaic solar power plant investment projects. *Renewable and Sustainable Energy Reviews, 14*(1), 249-264.

Cagliano, A. C., Pilloni, M. T., & Rafele, C. (2014). A multi-criteria fuzzy method for selecting the location of a solid waste disposal facility. *International Journal of Management and Decision Making*, *13*(3), 221-249.

Chang, Y. (2012). *Core Competitiveness Evaluation and Promotion Strategy of Z Logistics Company Based on AHP-TOPSIS*. Master's thesis, South China University of Technology, China.

Chen, T. T., & Song, Y. F. (2013). Construction Planning Decision of Subway Stations Based on AHP-TOPSIS Method. *Journal of Underground Space and Engineering, 9*(2), 326-332.

Chou, T. Y., Hsu, C. L., & Chen, M. C. (2008). A fuzzy multi-criteria decision model for international tourist hotels location selection. *International Journal of Hospitality Management*, *27*(2): 293-301.

Chun, Y. L. (2016). *A comparative study on the construction factors of libraries of sports colleges and universities across the Taiwan Strait and based on AHP.* Master's thesis, Jilin Sport University, China.

Cui, R. H., Xu, J., Wang, Z. Y., & Zhong, J. Q. (2018). Evaluation of competitiveness of coastal sports tourism in China's coastal areas. *Journal of Liaoning Normal University (Natural Science Edition), 41*(1), 125-134.

Dai, J. D. (2019). *A study on the siting of commercial complexes in Guangzhou*. Master's thesis, Guangdong University of Technology, China.

De Felice, F., & Petrillo, A. (2013). Absolute measurement with analytic hierarchy process: A case study for Italian racecourse. *International Journal of Applied Decision Sciences, 6*(3), 209-227.

Delgado, A., & Romero, I. (2016). Environmental conflict analysis using an integrated grey clustering and entropy-weight method: A case study of a mining project in Peru. *Environmental Modelling & Software*, *77*, 108-121.

Deng, H., Yeh, C. H., & Willis, R. J. (2000). Inter-company comparison using modified TOPSIS with objective weights. *Computers & Operations Research, 27*(10), 963-973.

Deng, Y. F., & Zeng, Q. X. (2016). Srategies for Horse Racing Industry in Hubei Province. *Journal of Wuhan Institute of Pusical Education, 50*(1), 44-53.

Ertuğrul, İ., & Karakaşoğlu, N. (2008). Comparison of fuzzy AHP and fuzzy TOPSIS methods for facility location selection. *The International Journal of Advanced Manufacturing Technology, 39*(7-8), 783-795.

Gao, L. Z. (2006). Study on the Development of Sports Tourism Industry in the Changjiang River Delta. *Journal of Beijing Sport University, 29*(8), 1035-1037.

Gibson, H. J. (1998). Sport tourism: a critical analysis of research. *Sport management review, 1*(1), 45-76.

Gong, L., & Jin, C. (2009). Fuzzy comprehensive evaluation for carrying capacity of regional water resources. *Water Resources Management, 23*(12), 2505-2513.

Goodman, R. (1997). The luck business: The devastating consequences and broken promises of America's gambling explosion. *Trends in Organized Crime, 3*(2), 45-46.

Gratton, C., Dobson, N., & Shibli, S. (2000). The economic importance of major sports events: a case-study of six events. *Managing Leisure, 5*(1), 17-28.

Gu, S. F. (2014). *Research on location planning for "fitness circle" facilities of city community sports*. Master's thesis, Nanjing University of Aeronautics and Astronautics, China.

Hadadian, A. R., & Rasoulian, A. (2017). Using Analytic Hierarchy Process (AHP) for Selecting the Appropriate Country for Economic Integration: Case of Iran's Foreign Trade with OIC Countries. *International Research Journal of Finance and Economics, 162*, 24-32.

He, Y. X., & Zhang Y. W. (2018). Research on the development of Hainan horse racing industry under the background of international tourism island construction. *Sports Culture Guide, 2018*(10), 115-120.

Hu, Z. Y. (2006). *Research on modern urban sports facilities construction and urban development.* Doctoral dissertation, Southeast University, China.

Hua, G. (2013). *A study on the factors influence mainland China residents' gaming tourism destination choice.* Master's thesis, East China Normal University, China.

Huang, J. F. (2004) *The Study of Financial Risk Evaluation Model for the Leisure Farms Development in Taiwan.* Master's thesis, Feng Chia University, Taiwan.

Hudson, S., Ritchie, B., & Timur, S. (2004). Measuring destination competitiveness: An empirical study of Canadian ski resorts. *Tourism and Hospitality Planning & Development, 1*(1), 79-94.

Jing, X. B. (2008). *The study on comprehensive development of regional tourism real estate.* Master's thesis, Henan University, China.

Kang, Y. X. (2011). *Optimization of Modal Split in Tourism and Racreation Areas to Achieve Goals of Sustainable Transportation.* Master's thesis, Tamkang University, Taiwan.

Krelling, A. P., Williams, A. T., & Turra, A. (2017). Differences in perception and reaction of tourist groups to beach marine debris that can influence a loss of tourism revenue in coastal areas. *Marine Policy*, *85*, 87-99.

Kurtzman, J., & Zauhar, J. (1997). A wave in time – the sports tourism phenomena. *Journal of Sport Tourism, 4*(2), 7-24.

Lam, D. (2007). An observation study of Chinese baccarat players. *UNLV Gaming Research & Review Journal*, *11*(2), 5.

Lasanta, T., Laguna, M., & Vicente-Serrano, S. M. (2007). Do tourism-based ski resorts contribute to the homogeneous development of the Mediterranean mountains? A case study in the Central Spanish Pyrenees. *Tourism management, 28*(5), 1326-1339.

Li, J. (2018). Analysis of Siting Strategies for County and District Sports Centers - Taking the District Sports Centers of Foshan City as an example. *Housing and Real Estate, 2018*(10), 231-232.

Li X. (2013). *Analysis of the current situation of equestrian club development in China and research on related strategies.* Doctoral dissertation, TianJin University of Sport, Chian.

Li, Y. Z., Li, P. S., & Huang, D. (2013). Construction of an Evaluation System for Island Tourism Resources. *Resources Science, 35*(2):304-311.

Li, Z., Sun, C., & Zou, W. (2011). An evaluation of tourism development potential for island counties in China. *Resources Science, 33*(7):1408-1417.

Liao H. Y., Chen G. G., & Chen J. J. (2018). A Study on Service Quality Evaluation of Online Catering Takeout Based on Fuzzy Comprehensive Evaluation Method - A Case of ele.me. *Journal of Global Business Openration and Management*, *2018*(10), 81-90.

Lin, S. (2013). *GIS-based study on the leisure tourism sites siting evaluation of Chongqing.* Master's thesis, Southwest University, China.

Liu, D. Y., & Li, T. W. (2009). A study on location of racino in Taiwan island: A case in Miaoli. *Journal of Health Management, 7*(2), 145-163.

Liu, T. C. (2014). *The Site Selection Evaluation Indicators of Hotels Research by Applying Analytic Hierarchy Process.* Master's thesis, National Kaohsiung University of Hospitality and Tourism, Taiwan.

Masozera, M. K., Alavalapati, J. R., Jacobson, S. K., & Shrestha, R. K. (2006). Assessing the suitability of community-based management for the Nyungwe Forest Reserve, Rwanda. *Forest Policy and Economics, 8*(2), 206-216.

Na, R. H. (2015). *Researching on location of wind power farm based on fuzzy comprehensive evaluation model.* Doctoral dissertation, North China Electric Power University, China.

Nong, L. H. (2014). Research on Evaluation Index System of Urban Sports Tourism Competitiveness: A Case Study of Guangxi. *Journal of Qinzhou University, 29*(11), 53-58.

Pan, L. P. (2007). *Research the Degree of Tourists' Satisfaction of Inbound Tourists by Fuzzy Model – Take 14 Provinces as example.* Master's thesis, Shaanxi Normal University, China.

Peng, C., Wang, Y. Q., Zhou, C. X., Liang, Z. Y., . . . Cao, A. Q. (2011). The construction and discussion of the Guangzhou Asian Games Equine Disease-Free Zone. *China Animal Health Inspection, 28*(8), 9-18.

Qi, H. F. (2017). *A study on the establishment of index system of location selection of sports goods circulation industry distribution center.* Master's thesis, Jilin Sport University, China.

Saaty, T. L. (1977). A scaling method for priorities in hierarchical structures. *Journal of Mathematical Psychology*, *15*(3), 234-281.

Saaty, T. L. (1990). *Decision making for leaders: The analytic hierarchy process for decisions in a complex world*. Pittsburgh, Pennsylvania: RWS publications.

Saaty, T. L. (1990). How to make a decision: The analytic hierarchy process. *European Journal of Operational Research*, *48*(1), 9-26.

Saaty, T. L. (2003). Decision-making with the AHP: Why is the principal eigenvector necessary. *European Journal of Operational Research*, *145*(1), 85-91.

Saaty, T. L. (2008). Decision making with the analytic hierarchy process. *International Journal of Services Sciences*, *1*(1), 83-98.

Sahoo, M. M., Patra, K. C., Swain, J. B., & Khatua, K. K. (2017). Evaluation of water quality with application of Bayes' rule and entropy weight method. *European Journal of Environmental and Civil Engineering, 21*(6), 730-752.

Shen, C. Y. (2013). *Research on the Site Location Evaluation Method of the Large Stadium - Example of the Hangzhou Olympic Sports Expo City Site Location.* Master's thesis, Xi'an University of Architecture and Technology, China.

Shi, X., & Li, Z. M. (2017). Route selection method based on TOPSIS-AHP. *Journal of Shandong University of Technology (Natural Science Edition), 31*(4), 42-46.

Sirisawat, P., & Kiatcharoenpol, T. (2018). Fuzzy AHP-TOPSIS approaches to prioritizing solutions for reverse logistics barriers. *Computers & Industrial Engineering, 117*, 303-318.

Snyder, W. W. (1978). Horse racing: Testing the efficient markets model. *The Journal of Finance*, *33*(4), 1109-1118.

Sun, Z., & Tang, Y. (2011). On China Horse Racing Industry Structure and Its Optimization. *Journal of Wuhan Business University, 25*(5), 20-22.

Taherdoost, H. (2017). Decision making using the analytic hierarchy process (AHP); A step by step approach. *International Journal of Economics and Management Systems, 2, 244-246.*

Tam, F., Tsai, H., & Chen McCain, S. L. (2013). Tourists' and residents' perceptions toward casino gaming development in Hong Kong. *Asia Pacific Journal of Tourism Research*, *18*(4), 385-407.

Tam, M. C., & Tummala, V. R. (2001). An application of the AHP in vendor selection of a telecommunications system. *Omega, 29*(2), 171-182.

Tzeng, G. H., Teng, M. H., Chen, J. J., & Opricovic, S. (2002). Multicriteria selection for a restaurant location in Taipei. *International Journal of Hospitality Management*, *21*(2), 171-187.

Vallen, G. K., & Vallen, J. J. (2009). *Check-in check-out: Managing hotel operations*. Upper Saddle River, NJ: Prentice Hall.

Wang, H., & Wang, B. M. (2014). On fuzzy comprehensive evaluation of fireworks production works baced on AHP. *Journal of Safety and Evironment, 14*(3), 108-112.

Wang, H. L., & Zhou, W. J. (2018). Analysis of Factors on Development of Ice and Snow Sports Industry Based on AHP. *Journal of Jianghan University (Natural Science Edition), 46*(4), 374-378.

Wang, L. (2014). Construction and Application of Urban Tourism Competitiveness Evaluation Index System Based on AHP. *Areal Research and Development, 33*(4), 105-108.

Wang, Y. Z. (2013). Research on Competitiveness of China's Sport Tourism. *Journal of Beijing Sport University*, *3*(1), 11-12.

Wangchuk, R, Narat, H., & Siriwat, P. (2018). *Study on the factors influencing air cargo operation at Paro International Airport.* Paper presented at the 7th Business, Economic and Communication International Conference, Naresuan University, Thailand.

Wangdra, P. (2018). *Prioritizing Key Performance Indicators for Paro International Airport Operation Based on TOPSIS.* Master's thesis, Mae Fah Luang University, Thailand.

Wen, Q. (2018). *Investigation on Management of Equestrian Sport Base in Northern China.* Master's thesis, Inner Mongolia Agricultural University, China.

Wu, J., & Zhu, N. (2006). Fuzzy Comprehensive Evaluation Model of City Core Competitiveness. *Statistics and Decision Making, 2006*(10), 51-53.

Wu, Y., & Yang, M. C. (2019). Analysis of building renovation for the elderly based on AHP and fuzzy comprehensive evaluation. *Chinese Journal of Gerontology*, *39*(14), 3543-3547.

Xia, Y. J., Yang, C., & Xia, B. (2014). Modern Horse Racing Industry under the Background of Economic Transformation and Upgrading of China's Construction and Countermeasures. *Journal of Wuhan Business University, 28*(3), 51-54.

Xu, S. (2011). *Research on the criteria and evaluation system of international tourism island construction based on the perspective of inbound tourism.* Doctoral dissertation, Nanjing Normal University, China.

Yan, W. H. (2017). *Based on the Analytic Hierarchy Process (AHP) of Regional Sports Service Industry Competitiveness Evaluation.* Master's thesis, Shanghai University of Sport, China.

Yang, J., & Lee, H. (1997). An AHP decision model for facility location selection. *Facilities, 15*(9/10), 241-254.

Yang, M. M, & Li, Y. N. (2016). Study on Influence of Equine Disease-free Zone on the International Equestrain Events. *Journal of Wuhan Business University, 30*(3), 26-29.

Yang, X. P. (2015). *A Study on the evaluation and selection of tourism development pattern of uninhabited islands in Hainan.* Master's thesis, Hainan University, China.

Yuan, X. M., Zhang, X., & Yuan, J. G. (2017). The Fuzzy ANP and FCE Based Techniques for Evaluation and Classification of Coal Suppliers for Sea Port Enterprises. *International Journal of Information and Management Sciences*, *28*(3), 195-211.

Zhang, Q., Liu, Y., & Wang, J. H. (2018). Existing Disadvantages and Countermeasure of Public Sports Facilities Planing in China. *Journal of Tianjin University of Sport, 33*(4), 293-298.

Zhang, Y. H. (2014). Development of sports tourism market in Shandong canal culture region. *Journal of Shandong Institute of Physical Education and Sports, 30*(6), 39-45.

Zhong, C. C. (2014). *Research on the rational distribution of public sports venues in small and medium-sized cities.* Master's thesis, Nanjing Normal University, China.

Zhu, H. J., Zhang, L., & Bao, M. X. (2018). Case analysis and main enlightenment of the construction of international sports featured towns. *Journal of Shandong Sport University*, *36*(6), 28-34.

APPENDIX

APPENDIX

QUESTIONNAIRE

Thesis Survey Questionnaire

The Study of racecourses site selection - a case study of Hainan Province, China

I am Wang Xiaozhi, student ID No. 6151209258, currently studying MBA International Logistics and Supply Chain Management at Mae Fah Luang University, Chiang Rai, Thailand.

Objective

This study aims to derive the evaluative indicators affecting the racecourse site selection, and taking Hainan Province as an example to evaluate the suitability of the racecourse construction and the horse racing industry development in three major cities in Hainan Province.

The AHP method is used to prioritize the evaluative indicators in the following sections, A1: Land acquisition and construction conditions, A2: Personnel, A3: Economy, A4: Tourism resource, A5: Transportation, and A6: Facilities and services.

The success of this research depends on the willingness of the respondents such as your participation and we sincerely hope that you can be able to find time to answer the questions.

This research is being undertaken per the ethical procedure of Mae Fah Luang University. All the responses to this survey will remain confidential to the study team at Mae Fah Luang. Your information will not be disclosed to ensure anonymity.

We would like to thank you for your valuable contribution to this study.

I. Respondent Information

1. Position .....

2. Working experience (years): ☐<5, ☐ 5-9, ☐ 10-14, ☐ 15-19, ☐ 20+

The table below showed the importance scale and the definition. Please use this table in Part 1 and 2 respectively to mark the pairwise comparison of the evaluative indicators and the pairwise comparison of the candidate cities. importance scale from 1 to 9 with adefinition is shown in the table. **1** represents: Equally important, while **9** represents: Extreme important.

Importance scale	Definition
1	Equally important/advantageous
2	Equally to Moderately important/advantageous
3	Moderately important/advantageous
4	Moderately to Strongly important/advantageous
5	Strongly important/advantageous
6	Strongly to Very Strongly important/advantageous
7	Very Strongly important/advantageous
8	Very Strongly to Extremely important/advantageous
9	Extremely important/advantageous

Example

To be clear, the below table is done as an example. As you can see, the two evaluative indicators: Land acquisition cost and Demolition difficulty are pairwise compared to evaluate the relative importance between the 2. You can mark any number from 1 to 9 for their importance.

Indicator	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Indicator
Land acquisition cost	□	□	□	□	□	□	V	□	□	□	□	□	□	□	□	□	□	Demolition difficulty

In the above table, I have marked 3, which means that for me, Land acquisition cost is Moderately important than Demolition difficulty. If the 2 indicators are equally important, you can mark 1.

Part 1

Information on the importance of each evaluative indicator.

This part compares the 6 main evaluative indicators and 22 sub evaluative indicators. Please rate the following pairwise comparisons as shown in the example.

Indicator	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Indicator
A1: Land acquisition and construction conditions, A2: Personnel, A3: Economy, A4: Tourism resource, A5: Transportation, A6: Facilities and services																		
A1	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A2
A1	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A3
A1	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A4
A1	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A5
A1	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A6
A2	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A3
A2	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A4
A2	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A5
A2	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A6
A3	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A4
A3	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A5
A3	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A6
A4	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A5
A4	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A6
A5	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	A6

Indicator	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Indicator
B11: Land acquisition cost, B12: Demolition difficulty, B13: Land supply, B14: Geological conditions																		
B11	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B12
B11	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B13
B11	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B14
B12	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B13
B12	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B14
B13	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B14
B21: Middle and high-end Personnel, B22: General labor																		
B21	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B22
B31: Economic base, B32: Ability to attract investment, B33: Spending power, B34: Horse racing betting potential																		
B31	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B32
B31	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B33
B31	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B34
B32	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B33
B32	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B34
B33	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B34
B41: Terrestrial landscape, B42: Maritime landscape, B43: Biological landscape, B44: Cultural attractions, B45: Climatic conditions																		
B41	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B42
B41	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B43
B41	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B44
B41	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B45
B42	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B43
B42	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B44
B42	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B45
B43	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B44
B43	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B45
B44	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	B45

Indicator	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Indicator
B51: Road transportation capacity, B52: Rail transportation capacity, B53: Sea transportation capacity, B54: Air transportation capacity																		
B51	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B52
B51	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B53
B51	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B54
B52	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B53
B52	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B54
B53	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B54
B61: Catering and accommodation, B62: Other facilities and services, B63: Social security																		
B61	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B62
B61	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B63
B62	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	B63

Part 2

Information on the suitability of each candidate city for racecourse construction.

This part compares the suitability of the racecourse construction and the horse racing industry development in three major cities in Hainan Province. Please rate the following pairwise comparisons as shown in the example.

Candidate	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Candidate
B11: Land acquisition cost																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B12: Demolition difficulty																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B13: Land supply																		

Candidate	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Candidate
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B14: Geological conditions																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B21: Middle and high-end Personnel																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B22: General labor																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B31: Economic base																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B32: Ability to attract investment																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B33: Spending power																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B34: Horse racing betting potential																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya

Candidate	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Candidate
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B41: Terrestrial landscape																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B42: Maritime landscape																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B43: Biological landscape																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B44: Cultural attractions																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B45: Climatic conditions																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B51: Road transportation capacity																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
Sanya	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou
B52: Rail transportation capacity																		
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Sanya
Haikou	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	Danzhou

Candidate	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Candidate
Sanya	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
B53: Sea transportation capacity																		
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Sanya
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
Sanya	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
B54: Air transportation capacity																		
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Sanya
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
Sanya	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
B61: Catering and accommodation																		
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Sanya
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
Sanya	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
B62: Other facilities and services																		
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Sanya
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
Sanya	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
B63: Social security																		
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Sanya
Haikou	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou
Sanya	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	Danzhou

Part 3

Opinions and recommendations

If there are any more opinions and recommendations about this study, please write below:

.....

.....

.....

.....

Thank you very much for your cooperation

CURRICULUM VITAE

CURRICULUM VITAE

NAME Mr. Xiaozhi Wang

DATE OF BIRTH 20 June 1992

ADDRESS Ganjingzi district, Dalian, Liaoning, China

EDUCATIONAL BACKGROUND

2014 Bachelor of Arts
Advertising
Henan University, China

WORK EXPERIENCE

2016-2017 Mandarin Teacher
Liaobei School, Laos

2014-2016 Mandarin Teacher
University of Malaysia, Pahang