CHINESE MAINLAND TOURISTS' EVALUATION OF RISKS OF THAILAND, MALAYSIA AND SINGAPORE ON FUZZY LOGIC MODEL

By

Ms. Teng Weifeng

Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Arts in Tourism Management in the
Graduate School of Tourism Management

Assumption University
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ACCEPTANCE

This dissertation was prepared under the direction of the candidate's Advisor and Committee Members/Examiners. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Master of Arts in Tourism Management in the Graduate School of Tourism Management of Assumption University of Thailand.

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ABSTRACT

Tourist risk is a barrier for tourism expansion. Thailand, Malaysia, and Singapore are usually arranged into a one package tour program for Chinese mainland tourists. As such, exploring the tourists' risk weighting, comparing their perceived risk in these destinations, and providing related suggestions comprise important information for local and regional tourism development of the Mainland Chinese tourist market.

Safety of transportation, law and order, hygiene, accommodation, weather, sightseeing spot, and medical support are listed as the independent variables in this study framework, which also serve as evaluation criteria. Perceived relative safety of Thailand, Malaysia, and Singapore are the dependent variables.

In order to measure tourists perceived risk quantitatively while considering evaluators' uncertainty of natural language description, this study employs an Analytic Hierarchy Process (AHP) method to determine the weighting of various risk evaluation criteria and applies fuzzy logic to make subjective judgments. A Fuzzy Multiple Criteria Decision-Making (fuzzy MCDM) approach is used to conduct the evaluation of tourist risk to make the study more objective.

In terms of importance, the seven safety components are arranged in declining order as follows: law & order, hygiene, medical support, accommodation, sightseeing location, transportation and weather. In general, Singapore is perceived as the safest destination, Malaysia second and lastly Thailand. Comparing the seven safety components of the individual destinations together with importance weights, for Thailand, safety performances of hygiene and law & order need urgent improvement; safety performances of transportation, medical support, sightseeing location, and weather

have competitive advantages. For Malaysia, hygiene safety demands immediate attention; safety performances of transportation, medical support, and sightseeing location have competitive advantages. For Singapore, almost all of the safety factors are satisfactory.

Tourist risk reduction is not the sole responsibility of the tourism industry. Regional and international cooperation, seeking prevention of terrorism should be promoted and institutionalized. Compared to Singapore, Thailand and Malaysia should endeavor to improve perceptions regarding keeping social order and law enforcement to make tourists feel at ease. Better control of preventive epidemic systems to diminish tourists' possibility of contracting infectious diseases is also required. The "zero-dollar tour" must be controlled for Southeast Asia tourism. The tourism business sector also needs to attend to national and regional benefits apart from internal safety management. For the three destinations studied, those safety factors having competitive advantages are well worth publicizing.

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CHAPTER I

INTRODUCTION

1.1 Background of the study

1.1.1 Overview

The World Travel and Tourism Council (WTTC) considers tourism as the world's largest industry. Tourism has boomed since the 1840s and international tourism grew dramatically after the 2nd World War, with international annual growth rates in tourist arrivals of over 7% from 1950 to 1990. The World Tourism Organization (2002) reported that the world tourist arrivals was 697 million and 689 million in 2000 and 2001 respectively, and has predicted it will reach billions annually by the 21st century.

Tourism is defined as the temporary short-term movement of people to destinations outside the places of work and residence, the activities undertaken during their stay in those destinations and facilities created for their needs (Mathieson & Wall, 1982, cited in Burn & Holden, 1995). The purpose of a tourist can be categorized as leisure (whether for recreation, health, sport, holiday, study or religion), business, family, mission or meeting (Holloway, 1994).

In other words, tourism is an activity engaged in by people who travel. This activity involves many components such as transport, accommodation & catering,

attraction, travel organizer and destination tourism organization. It can be said that tourism is knitting a relationship net between all interrelated parts and peoples, just as Peck and Lepie (1989) noted, "the nature of tourism in any given community is the product of complex, interrelated economic and political factors, as well as particular geographic and recreational features that attract 'outsiders'" (cited in Hall, 1994, p.3).

Risk is the possibility or chance of meeting danger, suffering loss, injury, and so forth. Tsaur, Taeng and Wang (1997) gave the definition of tourist risk as "the possibility of various misfortunes that might befall a tourist in the process of traveling or at its destination". Further more, according to Hall (1994), safety can be perceived in terms of the dangers presented by physical disasters, health concerns, crime and the potential for political violence.

Like the dilemma of return and risk, traveling always involves an element of risk. In retrospect of the activities and relationships, tourism can provide travel experience to tourists and satisfy their needs or demands in areas such as health, VFR, recreation, relaxation, education, and business. However, tourists have to entail risks and suffer from the bitter inevitably. On the other hand, each component of tourism carries its own level of risk (Robinson & Marlor, 1995). Pretending that the risk does not exist, or ignoring its incidence and its causes, is similar to ignoring that tourism has environmental and cultural impacts.

The increasing level of perceived risk amongst potential tourists has an effect on the tourist demand. Most of the evidence on tourist motivations points to insecurity as a major barrier to travel and thus a limitation on the growth of the industry. In

addition to openly stated fear, there is often an expression of a lack of interest in travel, which can mask an underlying fear. Terrorism, crime, violence, political turmoil, general lawlessness, ethnic and religious conflict, poor infrastructure, pollution, diseases and an unstable atmosphere are just some variables which become obstacles for tourists' travel.

To be successful in tourism, tourist risk issues must be faced. Both tourism supply side and the users should realize that some risks can never be wholly removed, however, a large number of risks can be minimized by careful planning and travel-risk research.

1.1.2 Country introduction

1.1.2.1 China as a tourist source

Since 1978 when the open-door policy was implemented, tourism in Mainland China has made remarkable progress. With the advent of the 1990s, domestic travel, inbound travel, and outbound travel all moved into the fast lane.

Especially, China stimulated outbound travel in 1983 when Hong Kong and Macao were approved to be outbound destinations. Since the early 1990s, outbound travel has been boosted quickly, and now there are a total of 21 nations or regions that are listed in the Approved Destination Status, as shown in Appendix A (China National Tourism Administration, 2002).

With the greater integration into the world family, China relaxed their overseas travel policy, for example the introduction of a simplified passport application and

extended passport validity to 5 years. Moreover, the Chinese government is planning to grant more holidays to increase consumption and to alleviate pressure from "golden weeks" (i.e. "holiday tourism"). This policy will also become a driving force for outbound tourism. At the same time, Mainland China has a population of 1.2 billion, a potentially gigantic source of tourism for the world.

As can be seen from Table 1.1, according to the statistics provided by the China National Tourism Administration (2002), from 1994 to 2001, the number of Chinese outbound tourists rose sharply year on year. The WTO (World Tourism Organization, 2002) has reported Mainland China was the 9th top tourism spender worldwide in 2000, with the US$13.1 billion international tourism expenditure.

Certainly the Chinese government's urge and economic development backed this increasing scenario. Under current national restructuring, tourism has been designated as an important growth area. Meantime, China has kept GDP rising at a high rate over the last 20 years and in 2001 amounted to approx US$1,160 billion (9,593.3 billion yuan). The real GDP per capita of Mainland China was US$719.30 in 2002, whereas it was only US$348 in 1990 ("Explanation of GDP and its components", 2002).

Table 1.1

China outbound, domestic, and inbound tourist numbers (1994 – 2001)

Year	Outbound travel (million)	Domestic travel (million)	Inbound overnight visitor arrivals (million)
1994	**3.7**	524	21.1
1995	**4.5**	629	20.0
1996	**5.1**	639	22.8
1997	**5.3**	644	23.8
1998	**8.4**	659	25.1
1999	**9.2**	720	27.0
2000	**10.5**	744	31.2
2001	**12.1**	784	33.2

Source: China National Tourism Administration (CNTA) (2002)

It is worth noting that domestic travel is the most developed field for Mainland China in terms of tourism industry. Renewed ethics, increased leisure time and disposable income are main factors that motivate the Chinese mainland people to take delight in traveling.

For inbound travel, China was the 5th most popular tourist destination and the 7th top tourist earner in the world in 2000, and will become the most popular tourist destination by the year 2020 (World Tourism Organization, 2002). The number of overseas tourists visiting China in 2001 reached 89 million. The total foreign exchange

earnings from overseas tourists were US$17.8 billion (China National Tourism Administration, 2002).

Table 1.1 shows the development of Chinese domestic and inbound travel.

1.1.2.2 Thailand as a tourist destination

Thailand, with a 60.6 million population, has an area of 513,115 square kilometers. Its per capita GDP in 2001 was US$1,811 ("ASEAN statistical yearbook 2001", 2002). Shinning under Buddhism spirit and Thai culture, Thailand is renowned for the Thai's smile and hospitality.

Tourism is a core industry in Thailand. Ruins, temples, islands, beaches, and food are famous attractions for tourists. The 2001 statistical report by the TAT (Tourism authority of Thailand, 2002) said that international tourism receipts in 2001 were approx US$6.8 billion (299 billion Baht), sharing 5.86 percent of national GDP. Since 1997, tourism receipts have been ranked 2nd among major exports.

The beginning of international tourism in Thailand can be traced back to as early as the 17th century. In the past few decades, Thailand has been enjoying a quick development of tourism, although they have faced some environmental challenges.

The TAT has been successfully conducting a series of promotion campaigns that are crucial in attracting international inflows. From the tourism statistics of international arrivals published by the TAT (see Table 1.2), it can be seen what phenomenal progress Thailand's tourism has made in recent years. Focusing on 2001,

there were 10,061,950 international tourist arrivals, a 5.82 percent increase compared to 2000 (Tourism authority of Thailand, 2002).

Table 1.2

Thailand international tourist arrivals (1997-2001)

Year	International tourist arrivals (000)	Growth Δ %
1997	7,221	---
1998	7,755	7.39
1999	8,580	10.64
2000	9,509	10.83
2001	10,062	5.82

Source: Tourism Authority of Thailand (TAT) (2002)

China is one of the major target markets for Thailand's tourism industry. In 2000, the number of Chinese mainland tourist arrivals was 704,463, a 7.35 percent market share. In 2001, 695,372 Mainland Chinese tourists visited Thailand, 1.29 percent decrease compared to the previous year, when the market share was 6.86. In 2001, the total expenditure of Chinese mainland tourists in Thailand was US$382.10 million (4,226.82 million Baht) (Tourism Authority of Thailand, 2002).

1.1.2.3 Malaysia as a tourist destination

With a 329,750 square kilometer area, and a 23.8 million population, Malaysia is often regarded as the melting pot of the whole of Asia. Visitors can witness the harmonious blend of Asia's three oldest civilizations, Malays with their Arabic influences as well as the Chinese and Indian civilizations. GDP per capita in 2001 was US$3,696 ("ASEAN statistical yearbook 2001", 2002).

For "truly Asia" Malaysia, 1987 was a historical year for the travel industry. It witnessed a strong will on the part of the tourism industry in the country, and in 1992, the Malaysia Tourism Promotion Board (or Tourism Malaysia) was established. Currently, Malaysia is gaining popularity not only as a leisure destination but also as a choice for MICE market in the region. Under the vision of marketing Malaysia as a destination of excellence, the number of international arrivals rose to 12,755 million in 2001 (Table 1.3). This influx of visitors earned Malaysia US$6.3 billion (RM24.2 billion) in tourism receipts (Tourism Malaysia, 2002).

Malaysian government statistics revealed that Mainland China was ranked No. 4 in the top ten tourist arrivals in 2001 for Malaysia. In 2001, Malaysia hosted 453,246 Chinese mainland tourists, 6.6 percent up on 2000, resulting in US$500 million revenue. Moreover, Malaysia has set a goal of attracting 1 million Chinese travelers (Wang, 2002).

Table 1.3

Malaysia international tourist arrivals (1997-2001)

Year	International tourist arrivals (000)	Growth Δ %
1997	6,211	---
1998	5,551	-10.63
1999	7,931	42.88
2000	10,222	28.89
2001	12,775	24.98

Source: Tourism Malaysia (2002)

1.1.2.4 Singapore as a tourist destination

Singapore is a city-state of 683 square kilometers with a population of approximately 4.1 million. With the properties of a developed country, its per capita GDP reached US$20,700 in 2001 ("Singapore", 2002). It is well known for world-class infrastructure including one of the world's best airports.

Singapore has been promoted as a tourist destination since the early 1960s when the Singapore Tourist Promotion Board (STB) was created. In recent years, it has culminated over 7.6 million visitors annually, generating over US$10 billion worth in tourism receipts and a contribution of 4-5% to Singapore's GDP ("Singapore tourism

study tour", 2002). Positioning Singapore as a Tourism Capital in the 21st century is a new vision.

Table 1.4

Singapore international tourist arrivals (1997-2001)

Year	International tourist arrivals (000)	Growth Δ %
1997	7,198	---
1998	6,242	-13.28
1999	6,958	11.47
2000	7,691	10.53
2001	7,519	2.24

Source: Singapore Tourism Board (STB) (2002)

Singapore is in prime position to cash in on the growing trend of Chinese holidaymakers making trips overseas. Mainland China has become the second largest tourism market for Singapore, after Indonesia, according to STB numbers for the first five months of 2002, catapulting them from 10th place five years ago (Chia, 2002). In 2001, 50,000 people headed to Singapore from Mainland China. A Chinese traveler spent US$286.3 (500 Singapore dollars) each day on average while visiting Singapore (Wang, 2002).

Thailand, Malaysia and Singapore are all in China's ADS (Approved destination status) list for Chinese mainland outbound tour groups. All located in Southeast Asia, these three nations are often combined into one itinerary for China's tour operations and travel agencies. However, re-visitors and free independent tourists may make their selection based on their images or comparisons. Hence, Thailand, Malaysia and Singapore are competing against one another for the Mainland China tourist market, each of them hoping to eclipse their Southeast Asian rivals and to take over top spot destination.

1.2 Statement of the problems

Mainland Chinese tourists have contributed to national and world tourism development, and still there is a large potential of stream indulging in future travel either for the outbound field or domestic field.

However, this increase has naturally entailed increases in travel-related misfortunes (Tsaur et al., 1997). Chinese mainland tourists abroad have experienced robbery and theft, fraud, infectious diseases, and transport accidents on frequent occasions. This is often the result of tourist destinations' pursuing economic benefits whilst neglecting tourist safety. Furthermore, the communication of tourist risks is part of a much deeper-rooted problem in the travel and tourism industry.

Under the present threat of serious terrorism attacks, travel safety and security problem is not an inordinate fear for Mainland Chinese. The ongoing high risk has

tainted some destinations' image and become a latent hazard for further expansion of tourism.

Travel risk is impossible to fully eliminate because in human life all activities entail possible losses. Nevertheless, it is hoped that tourist risk can be reduced if advance warning and prevention can be obtained through risk evaluation and communication.

Hence, the questions addressed here are:

- How Chinese mainland tourists evaluate the relative importance of risk components differently?
- Whether Chinese mainland tourists perceive the same level of risk among Thailand, Malaysia and Singapore?
- For both tourist destinations and sources, considering tourism safety, is there something that should be improved or adjusted?

1.3 Research objectives

The major objectives of this study are as follows:

- To explore the weight of importance of various risk components viewed by Chinese mainland tourists.
- To compare perceived tourism safety among Thailand, Malaysia and Singapore in terms of transportation, law & order, hygiene, accommodation, weather, sightseeing location, and medical support.

- To assess each destination's safety situation/performance on each component by combining it with their relative importance.
- To provide suggestions to tourism organizations, tourism business sector, local communities and governments of destinations, on the way in which to design and adjust tourism marketing strategies and operation policies, to reduce perceived tourism risk.

1.4 Research scope & limitation

This study aims to discover Mainland Chinese tourists' perceived risks in the areas of Thailand, Malaysia and Singapore so as to compare the safety of these three destinations. Seven tourism risks are measured. They are risks of transportation, law & order, hygiene, accommodation, weather, sightseeing location, and medical support.

The research involves the Chinese mainland tourists who have visited Thailand, Malaysia and Singapore in recent five years. As the questionnaire is designed to gather numerical data for the purpose of being analyzed through Analytic Hierarchy Process (AHP) and Fuzzy Multiple Criteria Decision-Making (Fuzzy MCDM) methods, the respondents should have a certain degree of comprehension and assessment abilities. Therefore, the survey is designed for respondents with higher education (i.e. above Bachelor degree according to Mainland Chinese's view) rather than people with poor literacy.

The survey was conducted in Hangzhou in Mainland China and Bangkok, Thailand, during November and December 2002.

The major limitation is the probable generalization problem. Generalizability is the degree to which a study based on a sample applies to the population as a whole. Firstly, this research does not rely on random sampling that is likely to yield a sample that truly represents the population. Secondly, for most Chinese mainland tourists who have joined the Southeast Asia trips, their average length staying in these three destinations was dissimilar. In general, the diverse length of stay hints the different possibility of tourist risk taking. Hence the results of this research may not be generalized to provide an accurate profile of Mainland Chinese's opinion.

1.5 Significance

The researcher's purpose is to discover tourism risk information that can play an important role in risk reduction.

The weights of various tourist risks towards transportation, law & order, hygiene, accommodation, weather, sightseeing location and medical support will make related social sectors discern the importance of their role. More specifically, tourists' evaluation regarding the safety of these aspects can urge these sectors to alter their performance considering their comparative importance.

In addition, the comparative result of this study will provide evidence and suggestions to governors, policymakers and marketers of the three areas. This will enable greater understanding of their tourism safety situation, aid them to discover the problems and coordinate sectors to improve service quality in collaboration, and to

gain competitive advantages. In doing so, these tourism destinations might gain a higher tourist inflow with the possibility of reducing the tourism risk barriers.

1.6 Glossary

***AHP*:** Analytic Hierarchy Process. An analytical tool, supported by simple mathematics, that enables people to explicitly rank tangible and intangible factors against each other for the purpose of resolving conflict or setting priorities. ("Analytic Hierarchy Process", 2000)

BNP value: Best Nonfuzzy Performance value. This value is located by the Best Nonfuzzy Performance that is a procedure of defuzzificaiton for the purpose of nonfuzzy ranking for fuzzy numbers. Methods of such defuzzified fuzzy ranking generally include mean of maximal (MOM), center of area (COA), and α-cut. (Tsaur et al., 1997). In this study, the COA method is used for finding out the BNP values.

Fuzzy Logic: A type of logic that recognizes more than simple true and false values. With fuzzy logic, propositions can be represented with degrees of truthfulness and falsehood. (Zadeh, 1965, cited in "Fuzzy logic", 2001)

GDP: Gross Domestic Product. The market value of all the final goods and services produced within a country in a year, equals total consumer, investment and government spending, plus the value of exports minus the value of imports. ("Gross domestic product", 2002)

Importance: The word "important" is explained as "having great significance and value; carrying with it great or serious consequences" (The New Shorter Oxford Dictionary). Or "producing a great effect, having great influence or significance; mattering greatly" (The New Lexicon Webster's Encyclopedic Dictionary). With this sense, tourism industry researchers have been trying to find out what factors are important for tourists in relation with safety or security.

MCDM: Multiple Criteria Decision-Making. A scientific analysis approach to evaluate the gain and loss of alternatives under the consideration of multiple criteria. ("Introduction to MCDM", 2002)

Perceived risk: The uncertainty that consumers face when they cannot foresee the consequences of their purchase decisions. (Schiffman & Kanuk, 2000)

Safety: Free from danger and anxiety (Oxford Advanced Learner's dictionary). It can be perceived in terms of the dangers presented by physical disasters, health concerns, crime and the potential for political violence. (Hall, 1994)

Set: A group or collection of objects or numbers, considered as an entity unto itself. ("Set", 2002)

TFNs: Triangular fuzzy numbers. TFNs are a subset of fuzzy sets with properties that make them well suited for modeling and design-type activities. It can be represented by the triple (minimum value, core value, maximum value). (Ress D. A., 1999)

Tourism: The temporary short-term movement of people to destinations outside the places where they live and work, and activities during their stay at these destinations. (Middleton, 1994)

Tourist: The temporary visitors staying at least 24 hours, whose purpose could be categorized as leisure (whether for recreation, health, sport, holiday, study or religion), or business, family, mission or meeting. (Holloway, 1994)

Tourist risk: The possibility of various misfortunes which might befall a tourist in the process of traveling or at its destination. (Tsaur et al, 1997)

Weight: A fractional value between 0 to 1. The weight of the child indicators belonging to the same parent must sum to 1. (Orca computer Inc. 2000)

Zero-dollar tour: Also named "zero-dollar package" or "zero-dollar group". It is common in Southeast Asia, especially aimed at Chinese tour groups. Under the package, the tourists pay a very low price for a tour program, and the inbound operators receive no money from the tour organizers even though they look after the tour groups. As a result, local tour guides turn to persuading or even forcing tourists to buy local products or services so as to make money. ("Thailand to prevent Chinese tourists from being cheated", 2000)

CHAPTER II

LITERATURE REVIEW

Chapter two is in three parts. The first part is the literature to support the framework that presents the key concepts and the relationship between these key concepts. The second part is the literature in support of the methodology. The last part reviews the empirical findings of previous researches.

2.1 Literature to support framework

2.1.1 Key concepts

Safety

Safety is freedom from danger and anxiety (Oxford Advanced Learner's Dictionary). It is an essential component of the attractiveness of destinations and transport routes to tourists (Hall & Sullivan, 1996).

According to Hall (1994), safety can be perceived in terms of the dangers presented by physical disasters, health concerns, crime and the potential for political violence and so forth. Whilst weighted differently, all these safety concerns are of importance for the tourist.

It is always a controversial deal regarding who should be responsible for tourists' safety (Robinson & Marlor, 1995).

Host destinations should bear some responsibility for tourist safety. In practice this would include a number of players including tourism officials, the local authorities, the police and tourism business suppliers.

The tour operator and travel agent do have a responsibility to their clients to pass on information regarding the level of risk. However, this presupposes that this information is available, accessible and accurate. For reasons of profit, they may discount or conceal some unsafe conditions or even announce their trips are "risk-free".

Simultaneously, however, there is a string argument for prospective tourists to take it upon themselves to find out about their destinations, and make their own assessments regarding the safety.

Tourist risk

Tourist risk can be defined as the possibility of various misfortunes that might befall a tourist in the process of traveling to or at its destination.

Since travel, especially holiday related travel, can involve significant financial and emotional investment, there is always a risk that the experience fails to live up to expectations. The accommodation may not be of the standard expected, the food may be awful, the resort noisy and the weather lousy. Tourists can be left thinking "what a waste of money" after returning from a trip. Although relatively rare, a more serious category is the risk of personal injury, such as the scourge or contingencies of aircraft crashes, ship fires and ferry disasters (Robinson & Marlor, 1995).

The classification of tourist risk is with diversification. Moutinho (1987) divided tourist perceived risk into five major categories: functional risk, physical risk, financial risk, social risk, and psychological risk. Schiffman & Kanuk (2000) concluded that there were six types of risks perceived by consumers when making product decisions, which were functional risk, physical risk, financial risk, social risk, psychological risk, and time risk. Function risk is the risk that the product will not perform as expected; physical risk is the risk to self and others that the product may pose; financial risk is the risk that the product will not be worth its cost; social risk is the risk that the product choice may result in social embarrassment; psychological risk is that a poor product choice will bruise the consumer's ego; and time risk is the risk that the time spent on product search may be wasted if the product does not perform as expected.

Tsaur et al. (1997) quoted other previous theories of classification as follows: Roselius (1971), in consumer's behavior research, described the types of consumer (tourist) loss as time loss, hazard loss, ego loss, and money loss. Roehl and Fesenmaier (1992) have categorized tourist risk into seven groups, they were equipment risk, financial risk, physical risk, psychological risk, satisfaction risk, social risk, and time risk. Bettman built a theoretical model and measurement system for perceived risk, which included inherent risk and handled risk. Pingey and Iverson (1994) have explored safety concerns centering on typical vacation activities among Japanese visitors to Guam. Seven factors of safety were of interest, which were the perceptions of the described safety, sightseeing safety, water sports safety, beach activity safety, nightlife safety, in-car safety, and road safety.

Moreover, Tsaur et al. (1997) developed a seven-type tourist risk model. It includes aspects of transportation safety, law and order safety, hygiene safety, accommodation safety, weather safety, sightseeing spot safety, and medical support safety. Overall, these seven risks are induced into two main categories as physical risk and equipment risk. Physical risk refers to the possibility that an individual's health is likely to be exposed to risk, injury, and sickness because of conditions like law and order, weather, and hygiene problems found during the tour. Equipment risk refers to the dangers arising from the unavailability of equipment or its malfunctioning, such as insufficient telecommunication facilities, unsafe transportation, and break-down of vehicles, and so forth.

Ryan (1991) discussed the motivation for recreational tourism in dichotomies of "push- pull", the search for the "unfamiliar" and the security of the "familiar", the "risk-taker" and the "risk-averse". Ryan referred to Plog's model (1972) in that there was a continuum between types of tourists from the allocentric to the psychocentric tourist. The allocentrics seek new destinations and are prepared to take risks in searching for new cultures and places. On the other hand, the psychocentrics seek the familiar and are happier in an environment where there are many tourists who are like-minded. They are not risk takers and adhere to the proven product, being conservative in choice.

Schiffman and Kanuk (2000) illustrated that consumers must constantly make decisions regarding what products or services to buy and where to buy them. Because the outcomes (or consequences) of such decisions are often uncertain, the consumer

perceives some degree of "risk" in making a purchase decision. The definition of perceived risk highlighted two relevant dimensions: uncertainty and consequences. The degree of risk that consumers perceive and their own tolerance for risk taking are factors that influence their purchase strategies.

Furthermore, Schiffman and Kanuk (2000) pointed out that consumer perception of risk varies, depending on the person, the product, the situation, and the culture. One study also concluded that risk preference might be a stable personality trait, with experience a mediating factor in risk perception (Weber & Milliman, 1997, cited in Schiffman & Kanuk, 2000). Furthermore, an individual's perception of risk varies with product categories. Consumers perceive service decisions to be riskier than product decisions, particularly in terms of social risk, physical risk, and psychological risk (Nelson, 1998, cited in Schiffman & Kanuk, 2000).

Normally, tourists will handle risk through seeking more information, being brand loyal, selecting brand image, relying on store image, buying the most expensive model, and seeking reassurance.

The concept of perceived risk has important implications for marketers who can facilitate the product by incorporating risk reduction strategies in their promotional campaigns.

Image

Tourism image is defined as an individual's overall perception or total set of impressions of a place (Fakeye & Crompton, 1991; Hunt, 1975; Phelps, 1986, cited in

Brigne et al., 2001), or a person's beliefs, ideas, feelings, expectations and impressions about a place (Crompton, 1976).

The image of a destination consists, therefore, of the subjective interpretation of reality made by the tourist. In this configuration intervene both cognitive and affective factors (Moutinho, 1987, cited in Brigne et al., 2001). Whilst an individual gets his unique image depending on the interaction of personal values, attitudes, age, gender, the culture he belongs to, and his comprehension of the real world.

Wart (1996) has concluded that the image of places was derived from either personal experience or secondary information sources which included personal observations, the news and film media as well as from advertising campaigns. Hall and Sullivan (1996) figured that three elements were identified as leading to the creation of destination image: returning tourists experience through word-of-mouth, the media and the government of the tourist generation region. Rittichainuwat, Qu, and Brown (2001) quoted Gunn's argument that: destination image evolved at two levels, which were 'organic image' (communicated through and sourced in discourses of educational, electronic media and publishing institutions) and 'induced image' (also an institutional one but derived from events, symbols, and advertising produced by national tourist organizations).

The influence of image is not limited to the stage of selecting the destination, but also affects the behavior of tourists in general (Ashworht & Goodall, 1988, cited in Brigne et al., 2001).

2.1.2 The relationship between key concepts

Tourism products, in a large degree, are services with certain distinctive characteristics: intangible, variable, perishable, simultaneously produced and consumed.

Safety and risk are in negative relationship. The greater the risk is, the less safe the tourists will feel.

Safety or security is the critical pre-condition for both free independent tourists and group travelers, although arguably, the risk for the independent travelers is greater than for those who book a package tour, which may be compensated by the fact that more preparatory work may be planned to minimize the risk (Robinson & Marlor, 1995). Even though some allocentric tourists will search for adventures as their travel purpose, they still will not overlook a destination's safety.

Tourists' image of a destination's safety is related to the level of quality of intangible service and tangible product. Expectation is customer-defined probabilities of the occurrence of positive or negative events or actions, if the customer engages in some behavior (Oliver, 1980). If the product and service fail to meet the expectation of the tourists, no matter because of intrinsic or extrinsic cues, they will be regarded as dissatisfaction causes. Tourists regard these uncontrollable factors during trips as risks. In the absence of actual experience with travel itself, tourists often "evaluate" safety situations or tourist risks upon external cues such as safety brand image, and word-of-mouth of the destination.

A favorable image is an essential requirement for any successful tourist destination (Buckley & Klemm, 1993, cited in Hall, 1994). It is widely accepted that given the importance of image in destination choice, a negative image will, to a greater or lesser extent, discourage tourists (Crompton, 1976). The intangibility of the tourist product means that tourists are heavily reliant upon the images conveyed in brochures and trade advertising. Hall (1994, p.93) mentioned "given the requirement of many travelers to feel 'safe' when they visit a destination, perceptions of tourist safety become vital in attracting both international and domestic travelers".

Robinson and Marlor (1995) found that from the point of view of the consumer, the emphasis is increasingly upon the need for full and accurate information regarding a destination. Fastidious tourists do seek reassurance regarding prospective destinations.

Further reassurance can be communicated to tourists by reflecting upon risks as a problem of society and not specifically tourism. In some respects, risks against the tourist is no different to that carried out against any other member of society. It just so happens that the risks take place on a "temporary" member of a different society. For the individual, the result is the same. However, the impacts of tourist risks are not only felt amongst the host society and by other tourists, but across the international travel and tourism industry.

Going further, Robinson and Marlor (1995, p.126) stated:

> The influence of organically derived image is strong, but it is not insurmountable. Friendly and honest reassurance together with basic safety

information can minimize a loss in sales. The ideal situation is one which achieves a balance between providing a positive image of a destination and providing unambiguous information relating to the socio-economic and political realities which exist.

2.2 Literature to support methodology

2.2.1 Analytic Hierarchy Process (AHP)

Designed to reflect the way people actually think, Analytic Hierarchy Process (AHP) was developed more than 20 years ago. It is a mathematical technique for multi-criteria decision making, formulated by Saaty (1980, 1990), in which the hierarchy of components of the decisions were used in decision-making process. AHP is a powerful and flexible decision-making tool for complex, multi-criteria problems where both qualitative and quantitative aspects of a problem need to be incorporated. It helps decision makers structure the important components of a problem into hierarchical structure, then, by reducing complex decisions to a series of simple one-to-one comparison, ultimately synthesize the result (Person, 2001).

A series of "pairwise comparisons" which compares all the criteria to one another valued by Saaty's continual scale is the construction based upon by AHP. A pairwise comparison is the process of comparing the relative importance, preference, or likelihood of two elements with respect to the goal in certain levels. "Importance" is most appropriate when comparing objectives or criteria (Salnstri, 2002).

In pairwise comparison, if a person says: "X>Y", "Y>Z", and "Z>X". He would be inconsistent in his judgments.

The consistency measurement is useful for identifying possible errors in judgments as well as actual inconsistencies in the judgments themselves. It measures the degree of logical inconsistency of judgment by consistency ration *(CR)*. For most studies, it allows a certain degree of inconsistency within a domain. Generally, the reasonable *CR* should be less than 0.1. Perfect consistency implies a value of 0 (zero). For *CR* values greater than 0.1, the pairwise judgments have to be revised or rejected before the weights are computed ("Analytic Hierarchy Process product & tools", 2001).

AHP enables people to make decisions involving many kinds of concerns including planning, setting priorities, selecting the best among a number of alternatives, and allocating resources. That is to say, it not only helps decision-makers arrive at the best decision, but also provides a clear rational that it is the best. Users are allowed to assess the relative weight of multiple criteria in an intuitive manner.

2.2.2 Fuzzy logic

In our daily life, people often use words or phrases such as "quite large", "not safe", "rather dangerous", and "not fat". These terms of expression are with uncertainty. If a teacher uses "quite large" to describe the study progress that a student has made, the question is how much the progress's particular size fits the teacher's vague description of "quite large", or how to model the uncertainty of natural language. With different daily decision-making problems of diverse intensity, the result can be

misleading if the fuzziness (uncertainty) of human decision-making is not taken into account.

The idea of fuzzy logic was first advanced by Dr. Zadeh of the University of California at Berkeley in the 1960s and did not attract more attention until the 1980s ("Fuzzy logic", 2001).

Fuzzy logic attempts to formalize "approximate knowledge" and "approximate reasoning". It is a type of logic that recognizes more than simple true and false values. With fuzzy logic, propositions can be represented with degrees of truthfulness and falsehood. In other words, it is an approach to computing based on "degree of truth" rather than the usual "true or false" logic ("Fuzzy logic", 2001). For example, the statement of "today is sunny", might be 100% true if there are no clouds, 80% true if there are a few clouds, 50% true if it's hazy and 0% true if it rains all day.

Fuzzy logic is closer to the way our brains work. Applying fuzzy logic to this study can be more objective, considering the possible fuzzy subjective judgment of the evaluators during tourist risk evaluation.

2.2.3 Fuzzy set theory

The term "fuzzy" refers to a situation where there are no well-defined boundaries for a set of observations. A *set* is a group or collection of objects or numbers, considered as an entity unto itself. Each object or number in a set is called a member or element of the set ("Set", 2001).

Fuzzy systems are mathematically based systems. Fuzzy set theory, being pioneered by Zadeh, is the base of fuzzy logic. Similarly, it solves decision-making problems in which description of observations are imprecise, vague, and uncertain. That is, to deal with those propositions that have vague meaning (Neapolitan, 1992).

Zadeh provided the basis for a qualitative approach to the analysis of complex systems, in which linguistic rather than numerical variables are employed to describe system behavior and performance. In this way, a much better understanding of how to deal with uncertainty may be achieved, and better models of human reasoning may be constructed.

Fuzzy set theory, to treat fuzziness in data ("Application of fuzzy set theory", 1996). In classical set theory, the membership grade can be taken only as 0 or 1 (i.e. [0,1]). The value "0" is used to represent non-membership, and the value "1" is used to represent membership. However, in fuzzy set theory, the membership grade can be taken as a value intermediate between 0 and 1. The value "0" is used to represent complete non-membership, the value "1" is used to represent complete membership, and the values in between are used to represent intermediate degrees of membership.

The function of the membership grade is called its "membership function" in fuzzy theory. The user in consideration of the fuzziness will define the membership function. The membership functions are different from person to person.

Fuzzy set theory implements classes or groupings of data with boundaries that are not sharply defined (i.e., fuzzy). That is to say fuzzy set is a class with unsharp boundaries.

2.2.4 Fuzzy number

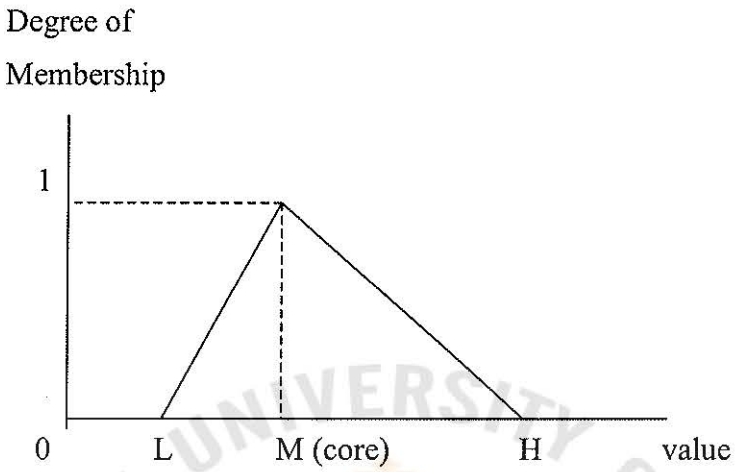
A fuzzy number is a quantity whose value is imprecise, rather than exact as is the case with an "ordinary" (single-valued) number. Any fuzzy number can be thought of as a function whose domain is a specified set ("Fuzzy number", 2001). Fuzzy set theory associates a real number R between 0 to 1 with the membership of a particular element x in a set. The membership function is $\mu_A(x)$: $R \rightarrow$ [0,1], where A can be called the fuzzy number. $\mu_A(x)$ stands for the degree that the element x belongs to the fuzzy set A.

Fuzzy numbers are a fuzzy subset of real numbers, and they represent the expansion of the idea of confidence intervals.

According to Zadeh, the fuzzy number can be triangular as (L, M, H), or (the lowest, the moderate, the highest), or (minimum value, core value, maximum value), and are known as "triangular fuzzy numbers" (TFNs). One reason why TFNs are well suited to modeling and design is because their arithmetic operators and functions are developed, which allow fast operation on equations (Ress, 1999). For such a number $\mu_A(x)$ = (L, M, H), its chart is displayed as in Figure 2.1, and its mathematical equation is:

$$\mu_A(x) = \begin{cases} (X-L)/(M-L), L \le X \le M \\ (X-H)/(M-H), M \le X \le H \\ 0, otherwise \end{cases}$$

Figure 2.1 The membership function of the triangular fuzzy number

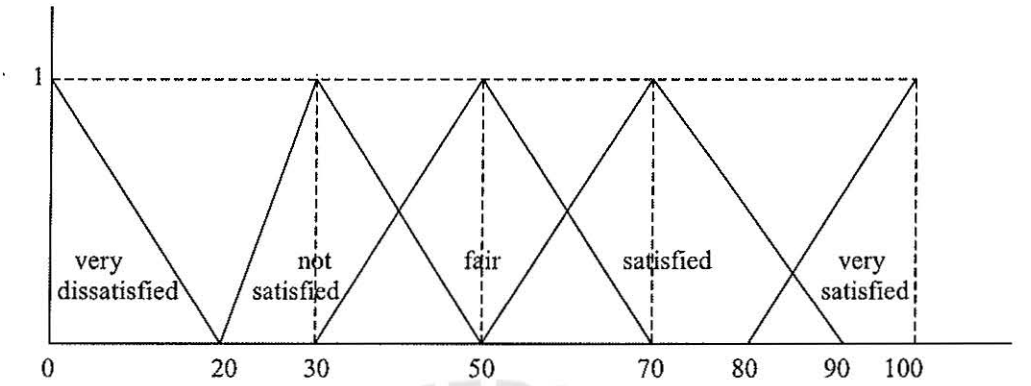


2.2.5 Linguistic variables

Fuzzy sets cover the domain of a variable with several fuzzy sets, and together with corresponding semantics, defines a linguistic variable.

A linguistic variable is a variable whose values are words or sentences in a natural or artificial language. For example, tourism safety expression can be taken on values such as "very satisfied", "satisfied", "fair", "not satisfied", and "very dissatisfied". The membership function of the expression values can be indicated by triangular fuzzy numbers, which are as shown in Figure 2.2 (as a case) if the scale range is 0-100.

Figure 2.2 The membership function of the five levels of linguistic variables



2.2.6 Multiple Criteria Decision-Making (MCDM)

MCDM is the scientific analysis approach to evaluate the gain and loss of alternatives under the consideration of multiple criteria. Ranking alternatives with multiple criteria is a common and important task in business organizations. In general, two basic categories to the MCDM problem can be distinguished: Multiple Attribute Decision Making (MADM) and Multiple Objective Decision Making (MODM). The MADM approach requires that the choice (selection) can be made among decision alternatives described by their attributes, solving a MADM problem involves sorting and ranking. In contrast to the MADM approach, in the MODM approach, decision alternatives are not given. MODM provides a mathematical framework for designing a set of decision alternatives. Each alternative, once identified, is judged by how close it

satisfied an objective or multiple objectives. Solving a MCDM problem involves selection. ("Introduction to MCDM", 2002)

The typical multiple criteria evaluation problem focuses on a set of feasible alternatives, and considers more than one criterion to determine a priority ranking for alternative implementation. This study emphasizes on MADM since it places its focus mainly on multiple criteria evaluation and ranking.

There are five principles that should be considered when criteria are being formulated. They are completeness (the criteria must embrace all of the important characteristics of the decision-making problems), operational (the criteria will have to be meaningful for decision-makers and available for open study), decomposable (the criteria can be decomposed from higher hierarchy to lower hierarchy so that the evaluation processes can be simplified), non-redundancy (the criteria must avoid duplicate measurement of the same performance), and minimum size (the number of criteria should be as small as possible so as to reduce the needed manpower, time, and cost) (Keeney & Raiffa, 1976, cited in Tsaur et at., 1997).

Bellman and Zadeh heralded the initiation of Fuzzy MCDM in the 1970s. The key point is management of evaluation criteria, it means using the measurement of linguistic variables to demonstrate the criteria performance and then indicating the linguistic variables of the judgment scale range.

2.3 Empirical findings

Consumer researchers are used to defining the concept of perceived risk in terms of the consumer's perceptions, both of the uncertainty and the magnitude of the possible adverse consequences. While the normally used words of "satisfied", "very satisfied", "fair", "very satisfied", "very dissatisfied" are uncertain too.

Since the degree of risk itself is not known with certainty, Tsaur et al. (1997) suggested that risk's evaluation must therefore be conducted in an uncertain, fuzzy environment. They conducted a tourist risk study in Taiwan during the 1990's. In the study, the respondents were 20 tour leaders from Taiwan travel agencies. Six international itineraries were used as alternatives for evaluation as follows: 4-day tour of Singapore; 7-day tour of Japan; 8-day tour of Bangkok and Phuket; west coast 12-day tour of the United States; 12-day tour of east-China; and 12-day tour of Three Gorges and Hwang-Shan, China.

Tsaur et al. (1997) have developed tourist risk measurement from epistemology perspectives firstly, while abstracting a scientific framework for the evaluation.

The evaluation framework was established based on literature reviews and expert consultation. It includes 7 distinct aspects of tourist risk as objectives and 16 attributes as evaluation criteria. Since these criteria of risk evaluation are endowed with diverse connotations and meanings, it is logical to treat them as if they are each of unequal importance. Consequently, the researchers used AHP method to assign relative weight to these evaluation criteria.

During the process of evaluation, criteria measurement indices cannot be clarified when the evaluators or respondents are unclear about criteria measurement, since this could make the values imprecise with too large an allowance for error. Therefore, Tsaur et al. employed Fuzzy MCDM to strengthen the comprehensiveness and reasonableness of the decision-making process. The researchers firstly asked numerical manner answers about linguistic variables. In other words, the respondents defined their own individual range (using triangular fuzzy number) for the employed linguistic variables according to their subjective judgments within a scale of 0-100.

Towards the six itineraries, the respondents evaluated itineraries' risks under every evaluation criterion. Linguistic descriptions were performed, after which, the researchers could correspond every respondent's linguistic descriptions to their numerical fuzzy judgment. Since it yielded a degree of variation in respondents' definitions of the linguistic variables, the researchers used direct average method to integrate the fuzzy judgment values of different respondents, towards the same risk evaluation criteria.

Obtained criteria weights and the fuzzy performance values of each criterion were combined in the process of final fuzzy synthetic decision. Defuzzification was then followed, to conclude a single figure for each alternative's safety to order all these alternatives. The greater the figure was, the safer the alternative would be.

Another reason for using multiple criteria decision-making method to conduct tourist risk research, according to Tsaur et al. (1997), was that traditional evaluation methods usually took the minimum cost or the maximum benefit, as their single index

of measurement criterion. This approach might sacrifice too much valuable information in an increasingly complex and diversified decision-making environment.

To sum up, tourists are seeking safety destinations with low risk and good image. On the other hand, tourist risk is inevitable, and sometimes it is ominous and causes irreparable damage to a destination's image. To deal with this issue, governments, tourism industry and other relevant sectors should make every effort to reduce tourist risk and minimize its negative effect.

In addition, it is of great importance to evaluate and communicate safety and risk information accurately in order to cope with the long-term development of tourism. The evaluation of tourist risk is not a simple question of "yes" or "no", therefore using fuzzy logic ethic is realistic to reflect tourists' perceived risk. Understanding the relative importance of various risks will be beneficial for decision-making of tourism management.

CHAPTER III

RESEARCH FRAMEWORK

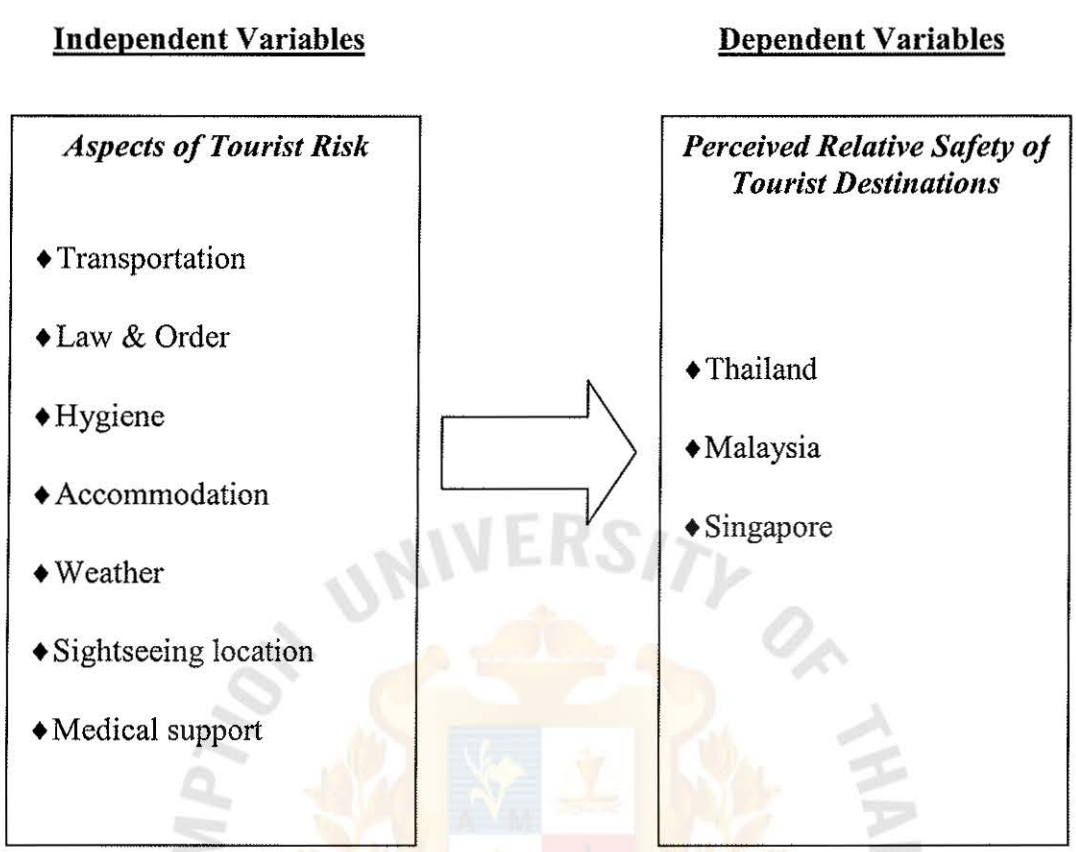
This chapter is presented in four parts including conceptual framework, definition of variables, hypotheses statement, and expected outcome.

3.1 Diagram of framework

The diagram of framework of this study is structured to illustrate the relationship between independent variables and dependent variables (see Figure 3.1). The model measures tourists' perceived risk regarding the destinations.

The independent variables are those factors that can influence tourism safety. Based on Tsaur et al. (1997), this study's independent variables cover seven aspects including transportation, law & order, hygiene, accommodation, weather, sightseeing location, and medical support. The dependent variables are perceived relative safety of three tourism destinations. These selected destinations are Thailand, Malaysia, and Singapore, which own different characteristics and have all become hot destinations in recent years.

Figure 3.1 Conceptual framework



3.2 Definition of the variables

Tourists may experience different risks in the different places they visit. Therefore, Chinese mainland tourists should have diverse safety images with regard to Thailand, Malaysia and Singapore.

Relative safety of these destinations means the comparison of results regarding the tourism safety situation. Tourists' views of transportation, law and order, hygiene,

accommodation, weather risk, sightseeing spot, and medical support are used to measure it.

Transportation risk is a concern for tourists with respect to safety of transportation, convenience of telecommunication facilities, safety of driving, and so forth. Transportation is the key channel to transfer tourists to destinations departing from their places of residence. Normally, the major four transports modes used by tourists when traveling involve aircraft, road, rail and water. It should be noticed that the "telecommunication facilities" is included here (Tsaur et al., 1997) because of the similar character of "spot-to-spot" connection.

Law and order risk is a tourists concern with respect to political stability of a destination, the possibility of criminal attack the tourists might encounter, and the attitude of inhabitants towards tourists. The inhabitants here should cover the people of a host community and all tourism service sectors. Political serenity constitutes the first and central requirement of tourism. Law reflects a nation's politic circumstance, the policies and restrictions to tourists. Social order influences tourists' physical and psychological security, even if with the existence of a "tourist bubble" or "tourist ghetto". Especially important is the reaction of residents and local business communities to tourist arrivals, for example, whether they issue acceptance or annoyance.

Hygiene risk is concerned with the hygiene of catering conditions and the possibility of contracting infectious diseases. Generally speaking, hygiene refers to conditions or practices (as of cleanliness) conducive to health.

Accommodation risk is the concern of tourists with respect mainly to hotel fire-control systems and hotel security systems. Accommodation usually refers to the lodging supplied with related services. It should provide what is needed or desired by travelers for convenience, and include facilities and services for safety and security.

Weather risk is a tourists concern with respect to the possibility of adverse weather conditions and the possibility of natural disasters.

Sightseeing location risk is a concern of tourists regarding the safety of recreational facilities and the quality of the management staff. In some degree, sightseeing locations are the real micro-destinations for tourists. Its safety situation should be managed by regional or local tourism businesses and management sectors.

Medical support risk is a concern for tourists with respect to the degree of assistance available in the case of an accident and the completeness of medical service system. Medical service facilities belong to the infrastructure supporting tourism development as well as local health protection. Medical service quality is related to the development of the economy, politics, technology, social civilization, and so forth.

In general, the above aspects can be divided into two main categories: physical risk and equipment risk.

3.3 Hypotheses statement

Working hypothesis is a tentative assumption made in order to draw out and test its logical or empirical consequences.

Tourist risk has negative relationship to tourism safety. The research of this study intends to compare the tourism safety level of the three destinations that are often bundled into one itinerary. In accordance with the importance weights of different risk aspects and feelings about destinations expressed by Chinese mainland tourists, the study aims at drawing a comparative conclusion about the destinations' current safety situations. The hypotheses of this study are expressed as ranking order of destinations' tourism safety (i.e. to find the one whose tourism safety is the best, the second best, and the one in last position). If the tourism safety of Thailand, Malaysia and Singapore are symbolized as S_T, S_M, S_S, respectively, as consequences, the hypotheses of this study are shown as follows:

H_1: $S_T > S_M > S_S$

H_2: $S_T > S_S > S_M$

H_3: $S_T > S_M = S_S$

H_4: $S_M > S_T > S_S$

H_5: $S_M > S_S > S_T$

H_6: $S_M > S_S = S_T$

H_7: $S_S > S_M > S_T$

H_8: $S_S > S_T > S_M$

H_9: $S_s > S_M = S_T$

H_{10}: $S_T = S_M = S_S$

H_{11}: $S_M = S_S > S_T$

H_{12}: $S_T = S_M > S_S$

H_{13}: $S_T = S_S > S_M$

Note:

- The number of various situations: $P_3^3 + P_3^2 + P_3^1 = 13$;
- S_T stands for the tourism safety of Thailand
- S_M stands for the tourism safety of Malaysia
- S_S stands for the tourism safety of Singapore
- ">" means "better than"
- "=" means "equal to" or "as same as"

3.4 Expected outcome

The study focuses on Chinese mainland tourists' evaluation of risks of Thailand, Malaysia, and Singapore in a numerical manner. Supposedly, the tourists who have been to these three countries should be able to classify the risk differences between destinations.

It is expected that the respondents could classify the relative importance of tourist risk factors through pairwise comparison. This is a kind of personal assessment according to tourists' own opinions. The yielded result of individuals' opinions is the clue of determining general evaluation criteria weights that is the cornerstone for the further synthetic evaluation of tourist risk evaluation.

Furthermore, respondents should be able to link the linguistic evaluation criteria of travel safety satisfaction such as "very dissatisfied", "dissatisfied", "fair",

"satisfied", "very satisfied" to the scale of "0~100". In other words, they should describe these fuzzy languages with three-level fuzzy numbers so as to define their ranges.

Because the study is touching upon complicated tourist risks and various Chinese mainland tourists, it lacks the confidence to predict exactly which of the above hypothesis would be proved, but it is circumstantial that the result might not meet the hypothesis of 10th (H_{10}: $S_T = S_M = S_S$).

CHAPTER IV

RESEARCH METHODOLOGY

Research methodology is defined as the part of the body of the report that explains the research design, sampling procedures, and other technical procedures used for collecting the data (Zimund, 1997). This chapter presents the methodology that is used to conduct this exploratory study. It includes four parts. They are data sources, data collection, data measurement, and data analysis.

4.1 Data source

Target Population & Population Element

The target population of this study are Chinese mainland tourists who have visited Thailand, Malaysia, and Singapore. In order to collect up-to-date information, ideally, their trips should have occurred in recent five years. Moreover, the respondents should have above average abilities of inducing, understanding, and assessing. Hence, the sampled respondents are the persons with higher education (i.e. above Bachelor degree) rather than people with poor literacy.

Sampling Unit

Sampling units are the units of analysis from which the sample is drawn. The questionnaires were distributed to sampled respondents who were in Hangzhou city, Mainland China, and at the Bangkok international airport, Thailand, during the period of November to December 2002.

Sampling Method

Non-probability sampling is the sampling techniques that do not use chance selection procedures. Rather, they rely on the personal judgment of the researcher (Malhotra, 2000).

Convenience type of non-probability sampling was used as the sampling technique due to the uncertain number of this population and limited locations of data collection. Basic information about respondents' experience towards outbound destinations and their education was collected in advance through oral inquiry in order to locate respondents.

Sample Size

Zimund (1997) mentioned that the determination of sample size depends on the research question and the variability within the sample.

With reference to the study conducted by Tsaur et al. (1997) who focused on the tourist risks of six itineraries perceived by Taiwanese, its sample size was 20.

However, it is reasonable that some answers regarding risk weight of the questionnaire may be not consistent enough, which means the consistency ratio of some answers may tend to be a large value (i.e. $CR > 0.1$). If revising is impossible, these questionnaires should be rejected and be replaced by other fit ones.

Therefore, the sample of this research was planned to the size of 40 respondents. The number of effective feedbacks must be at least 20.

4.2 Data collection

The major advantage of survey research is its flexibility. In this exploratory research, the researcher used survey method to collect the primary data via the most common survey instrument of questionnaire.

Self-administered questionnaire can be used to present questions and record answers in quantitative field research surveys. It is helpful as it saves respondents' time and motivates respondents.

A pilot study of 5 respondents had been done to examine whether the questionnaire was practical, and whether the data collection plan was appropriate. It aimed to detect problems that needed refining in the questionnaire design or instructions and data collection procedure.

The pilot study was carried out in Bangkok. It was found that the content and the form of this questionnaire were not familiar to the respondents. Hence, in order to help the following respondents to understand the questionnaire well, a brief

explanation of fuzzy number theory and an answer example for defining linguistic variables were added as "instruction" in section II.

Research data was collected in Hangzhou (35 copies), and Bangkok (5 copies).

Most Chinese mainland tourists visited Southeast Asia in group arrangements. Normally, Thailand was their first destination in accordance with their itineraries, followed by Malaysia and Singapore. Therefore, it was not easy to find suitable respondents in Thailand. As a result, only five copies of the questionnaire were distributed in Thailand by the researcher.

The other thirty-five copies of the questionnaire were distributed in Hangzhou. Hangzhou is the provincial capital of Zhejiang province of China. It is a political, economic, scientific, educational and cultural center of the province as well as a famous tourism city of China. The GDP per capita had exceeded $2,600 in 2000. Its citizens are fond of traveling. In recent years, a large number of Hangzhou people have visited Thailand, Malaysia and Singapore, and have had plenty of relevant travel experience. A softcopy of the questionnaire was e-mailed to two persons who were in Hangzhou and were entrusted by the researcher to collect data. These two persons were working in local travel agencies and had got higher education (i.e. they should have the ability to understand the questionnaire and fulfill the commitment). Furthermore, the researcher contacted these two deputies by telephone to insure that they had understood the questionnaire and data collection requirements completely. After data collection, the deputies had the hardcopies of the questionnaire brought to Thailand to the researcher.

For the data collection in both Thailand and Hangzhou, the target respondents were interviewed in advance to insure they have experience of traveling to these nations and they have received higher education. The questionnaires were then sent to the located respondents to obtain information about their numerical definition of linguistic variables, their evaluation of the three destinations' safety, and their assessment of risks' relative importance. However, considering the complexity of the questions of this study, proper explanation, instruction, and revision were given to the respondents when the self-administered questionnaire was taking place.

The conducting period was from November to December 2002.

4.3 Data measurement

A scale is a measure in which a research captures the intensity, direction, level, or potency of a variable construct (Neuman, 2000). It arranges responses or observations on a continuum. In this study, scale is employed from beginning to end.

To study relative importance of tourist risks, this study asks ordinal and interval types to measure the data. This pairwise comparison of relative importance is for the data analysis using AHP approach. There are total $C_7^2 = (7 \times 6) / 2 = 21$ pairs. When pairwise comparison, Saaty's nine-point scale for the comparative judgments is applied (see Table 4.1).

Table 4.1

Saaty's nine-point pairwise comparison value

Comparative importance/ Numerical Value	Definition/ Verbal Terms	Explanation
1	Equally important	A and B are of equal importance
3	Weakly more important	A is weakly more important than B
5	Strongly more important	A is strongly more important than B
7	Very strongly more important	A is very strongly more important than B
9	Extremely more important	A is extremely more important than B
2, 4, 6, 8	Intermediate judgment values	Judgment values between equally, moderately, strongly, very strongly, and extremely
Reciprocals		If g is the judgment value when A is compared to B, then 1/g is the judgment value when B compared to A

Source: Saaty (1980)

To study the tourism safety situation of the three destinations towards various criteria, five-point Likert-scaled attitude indicators are employed to measure the tourists' satisfaction or dissatisfaction level. This is an ordinal-level measure, including "very satisfied", "satisfied", "fair", "not satisfied", and "very satisfied".

Fuzzy number and interval measurement are combined to help tourists to define their own individual range subjectively, for the linguistic variables employed in this

study within the 0-100 scale, and help the researcher to measure the Likert scale data in fuzzy logic model.

4.3.1 Operationalization of variables

An operational definition is a definition stated in terms of specific testing criteria or operations. The definition specifies the characteristics to study and how they are to be observed.

Based on fuzzy theory, the results of Likert-scale measurement (ordinal) of each independent variable of "tourist risks" can be found in its corresponding fuzzy domain. The fuzzy domains are intervals.

The dependent variables are the relative safety of the destinations perceived by tourists. The alternatives are presented to the respondents explicitly here. From the criteria weights obtained from AHP stage and fuzzy performance values of each independent variable shared by these three objectives (i.e. destinations), the fuzzy synthetic calculation is done. Three sets of triangular fuzzy numbers of three destinations express the results of fuzzy synthetic decision. Subsequently, nonfuzzy stage is conducted for each set of triangular fuzzy numbers to arrive at a single figure. Thus, three single figures representing three destinations' safety levels are easily ranked.

Above all, the measurement of variables is done through operationalization as displayed in the following table (Table 4.2):

Table 4.2

Operationalization of variables

Variables	Operationalization	Measurement Scale
Risk of transportation	- safety of transportation - convenience of telecommunication facilities - safety of driving	Ordinal Interval
Risk of law and order	- political stability - possibility of criminal attack - attitude of inhabitants towards tourist	Ordinal Interval
Risk of hygiene	- possibility of contracting infectious diseases - hygiene of catering conditions	Ordinal Interval
Risk of accommodation	- hotel fire control system - hotel security system	Ordinal Interval
Risk of weather	- difference of weather change - possibility of natural disasters	Ordinal Interval
Risk of sightseeing location	- safety of recreational facilities - quality of the management staff	Ordinal Interval
Risk of medical support	- the degree of assistance available in case of accident - the completeness of medical service system	Ordinal Interval
Safety of Thailand	Measured by synthesis of potential and actual risks	Interval
Safety of Malaysia	Measured by synthesis of potential and actual risks	Interval
Safety of Singapore	Measured by synthesis of potential and actual risks	Interval

4.3.2 Questionnaire

The questionnaire, as shown in Appendix B, can be divided into three sections, besides the preamble.

The first section comprising of 21 questions (Q1 ~ Q21) is designed to attain the information of tourists' weighting regarding the importance of various risks. For each question, the respondents should answer which one is more important and how many times it is more important than another. Saaty's nine-point judgment value is provided to respondents as a show-card.

The second section containing 1 question (Q22), is designed to acquire respondents subjective definitions of the five-level linguistic variables standing for safety satisfaction levels in range (fuzzy set) and numerical manner (triangular fuzzy number). The overall scale is 0-100. The closer the number trends to "0", the lower the satisfaction level is, and vice versa.

The third section including 3 questions (Q23 ~ Q25) is designed to obtain respondents' evaluation with regards to the three destinations' (Thailand, Malaysia, Singapore) safety, according to the seven listed criteria. These 3 questions are expressed by 3 tables. Each question is composed of 7 sub-questions.

Table 4.3 reduces the arrangement of the questionnaire of this study.

Table 4.3

Questionnaire

Variables	Question Number
Section 1: Pairwise comparison of importance of various tourist risk factors (Qualitative & Quantitative)	
Compare importance of *transportation* and *hygiene*	Q1
Compare importance of *transportation* and *law & order*	Q2
Compare importance of *transportation* and *medical support*	Q3
Compare importance of *transportation* and *sightseeing location*	Q4
Compare importance of *transportation* and *weather*	Q5
Compare importance of *transportation* and *accommodation*	Q6
Compare importance of *law & order* and *hygiene*	Q7
Compare importance of *law & order* and *medical support*	Q8
Compare importance of *law & order* and *sightseeing location*	Q9
Compare importance of *law & order* and *weather*	Q10
Compare importance of *law & order* and *accommodation*	Q11
Compare importance of *hygiene* and *accommodation*	Q12
Compare importance of *hygiene* and *weather*	Q13
Compare importance of *hygiene* and *sightseeing location*	Q14
Compare importance of *hygiene* and *medical support*	Q15
Compare importance of *accommodation* and *weather*	Q16
Compare importance of *accommodation* and *sightseeing location*	Q17
Compare importance of *accommodation* and *medical support*	Q18
Compare importance of *weather* and *sightseeing location*	Q19
Compare importance of *weather* and *medical support*	Q20
Compare importance of *sightseeing location* and *medical support*	Q21
Section 2: Definition linguistic variables	
Describe linguistic variables with fuzzy set and triangular fuzzy number within the scale of 0-100	Q22
Section 3: Tourism safety evaluation	
Evaluate Thailand's tourism safety according to the seven criteria	Q23
Evaluate Malaysia's tourism safety according to the seven criteria	Q24
Evaluate Singapore's tourism safety according to the seven criteria	Q25

4.4 Data analysis

After necessary data collection, the feedback questionnaires are encoded and interpreted. Methods of Analytic Hierarchy Process (AHP) and Fuzzy Multiple Criteria Decision Making (Fuzzy MCDM) are employed to analyze data. As tools, *ExpertChoice 2000* software is used to conduct calculations of AHP; mathematics principles such as fuzzy number calculation and matrix calculation are used for Fuzzy MCDM step arithmetic operation.

Pre-testing

The researcher examined the questionnaire data coming from the pilot study. There were 5 respondents. Two of them were asked to revise their answers because of the large *CR* (i.e. $CR > 0.1$) of risk weighting.

The outcome of the pre-testing indicated that the data analysis procedure and approaches were practical and suitable.

4.4.1 Statistics used

The statistical tests for this study are conducted based on three studies, just as the three sections in the questionnaire. Most of the statistics are inferential statistics.

Concentrating on the statistics from Q1 to Q21, as aforementioned, AHP is practiced as the method to determine the weighting of various risks as evaluation criteria. The results are symbolized as Wt, Wl, Wh, Wa, Ww, Ws, Wm. (*Notes:* Wt -

weight of transportation; Wl - weight of law & order; Wh - weight of hygiene; Wa - weight of accommodation; Ww - weight of weather; Ws - weight of sightseeing location; Wm - weight of medical support).

Q22 provides statistics about respondents' numerical descriptions regarding the five-level linguistic variables (i.e. five-point Likert-scale about satisfaction feeling).

Statistics collected from Q23 to Q25 provide information for evaluation of tourism safety of Thailand, Malaysia and Singapore. These semantic data are corresponded to the data of Q22 for the purpose of treating "approximate description" with numbers. Since the existence of variation in respondents' definitions of linguistic variables (i.e. tourists may have divergent understanding with respect to the same linguistic variable), the average value should be used to integrate the fuzzy judgment values of different respondents towards the same risk evaluation criteria. This is a way of calculation using fuzzy addition and fuzzy multiplication rules.

Based on these statistics, Fuzzy MCDM method is conducted to achieve the synthetic assessment. That is, to reach the final finding regarding which destination is the safest for Chinese mainland tourists, which one featured as most risky, and which one is in the middle rank position. Finally, one of the hypotheses (H_1, H_2, H_3, H_4, H_5, H_6, H_7, H_8, H_9, H_{10}, H_{11}, H_{12}, H_{13}) can be proved to be acceptable.

4.4.2 Decision rule for interpretation

A weight is a fractional value between 0 and 1. Every sub-weight of the seven risk aspects should be located in the open interval (0, 1). The sum of all sub-weights must be 1. It is expressed as the equation: Wt + Wl + Wh + Wa + Ww + Ws + Wm =1.

In AHP, as computing the weights, the degree of inconsistency should be measured by the consistency ratio (*CR*). The Best Fit $CR \leq 0.1$.

The overall scale for definition of linguistic variables is 0-100. As for "satisfied", "fair", "dissatisfied", because their membership functions are all convex, three different numbers (i.e. minimum value, core value, maximum value) are needed for each to express respondents' feelings of being satisfied, fair and dissatisfied, respectively. While for "very satisfied", "100" is the upper limit, and "0" is the lower limit for "very dissatisfied". Besides, "100" and "0" are defined as the core values for "very satisfied" and "very dissatisfied" respectively, therefore, only one different number is requested for each. Figure 2.2 indicates the understanding of these membership functions.

The results of fuzzy synthetic evaluation of each alternative are still triangular fuzzy numbers, which should also indulge in the interval (0, 100).

The values of *BNP* numbers (i.e. Best Nonfuzzy Performance values) are compared. The greater the figure is, the safer the situation it stands for. And vise versa, the smaller the figure is, the riskier the situation it stands for.

4.4.3 Diagnosis of statistics methods

In this study, AHP is used to estimate a ranking of each of the criteria that describes the importance of each of them in contribution to the overall objective (i.e. to decide the relative importance of the criteria). Here, the overall objective is tourist risk; the seven risk factors are the criteria.

AHP can be conducted in 3 steps:

Step 1: Perform pairwise comparisons

The pairwise comparisons are translated from linguistic/verbal terms to numerical numbers, using the fundamental Saaty's nine-point judgment value for the comparative judgments. The result can be indicated as a matrix, as shown in Table 4.2. A matrix is a rectangular array of elements.

Table 4.4

Performance on criteria (tourist risks)

Criteria	T	L	H	A	W	S	M
T	1	1/Gtl	1/Gth	1/Gta	1/Gtw	1/Gts	1/Gtm
L	Gtl	1	1/Glh	1/Gla	1/Glw	1/Gls	1/Glm
H	Gth	Glh	1	1/Gha	1/Ghw	1/Ghs	1/Ghm
A	Gta	Gla	Gha	1	1/Gaw	1/Gas	1/Gam
W	Gtw	Glw	Ghw	Gaw	1	1/Gws	1/Gwm
S	Gts	Gls	Ghs	Gas	Gws	1	1/Gms
M	Gtm	Glm	Ghm	Gam	Gwm	Gsm	1

where, T- transportation; L- law & order; H- hygiene; A - accommodation; W - weather; S - sightseeing location; M- medical support

Step 2: Compute the weights of individuals

After pairwise comparing, the AHP makes some simple calculations to determine the weights of individuals'. It can be done by taking each entry and dividing by the sum of the column it appears in (i.e. to normalize each column of the matrix of "performance on criteria"). For instance, the (T, T) entry would end up as:

$$\frac{1}{Gtl + Gth + Gta + Gtw + Gts + Gtm}$$

here, the calculated result is denoted by $G_{(T, T)}$.

Similarly, the values of other entries can be gained, as revealed in Table 4.5.

Table 4.5

Weight on criteria

	T	L	H	A	W	S	M	Average
T	$G_{(T, T)}$	$G_{(L, T)}$	$G_{(H, T)}$	$G_{(A, T)}$	$G_{(W, T)}$	$G_{(S, T)}$	$G_{(M, T)}$	Wt
L	$G_{(T, L)}$	$G_{(L, L)}$	$G_{(H, L)}$	$G_{(A, L)}$	$G_{(W, L)}$	$G_{(S, L)}$	$G_{(M, L)}$	Wl
H	$G_{(T, H)}$	$G_{(L, H)}$	$G_{(H, H)}$	$G_{(A, H)}$	$G_{(W, H)}$	$G_{(S, H)}$	$G_{(M, H)}$	Wh
A	$G_{(T, A)}$	$G_{(L, A)}$	$G_{(H, A)}$	$G_{(A, A)}$	$G_{(W, A)}$	$G_{(S, A)}$	$G_{(M, A)}$	Wa
W	$G_{(T, W)}$	$G_{(L, W)}$	$G_{(H, W)}$	$G_{(A, W)}$	$G_{(W, W)}$	$G_{(S, W)}$	$G_{(M, W)}$	Ww
S	$G_{(T, S)}$	$G_{(L, S)}$	$G_{(H, S)}$	$G_{(A, S)}$	$G_{(W, S)}$	$G_{(S, S)}$	$G_{(M, S)}$	Ws
M	$G_{(T, M)}$	$G_{(L, M)}$	$G_{(H, M)}$	$G_{(A, M)}$	$G_{(W, M)}$	$G_{(S, M)}$	$G_{(M, M)}$	Wm

The next sub-step is to average each row of the matrix (i.e. to compute the average of the normalized columns). As shown in the right column of Table 4.5, these averaged values are the approximate weights of each criterion: Wt, Wl, Wh, Wa, Ww, Ws, Wm. (*Note*: this set of weights can be regarded as an eigenvector of the original matrix).

When computing individuals' weights, the consistency of pairwise judgment must be assessed.

In order to illustrate the procedure of consistency measurement simply and clearly, we create a pairwise comparison matrix A where $a_{ij} = w_i / w_j > 1$, $a_{ji} = w_j / w_i = 1/a_{ij} < 1$.

$$A = \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix} = \begin{bmatrix} 1 & w_1/w_2 & \cdots & w_1/w_n \\ w_2/w_1 & 1 & \cdots & w_2/w_n \\ \vdots & & \ddots & \vdots \\ w_n/w_1 & w_n/w_2 & \cdots & w_n/w_n \end{bmatrix}$$

If #i is a_{ij} times as desirable as #j, and #j is a_{jk} times as desirable as #k, then the consistency would require the #i is $a_{ij}a_{jk}$ times as desirable as #k.

w is an eigenvector of the matrix A, which can be the set of approximate weights of each criterion. λ_{max} is the positive real maximum eigenvalue of the matrix A. $\lambda = n$ is the corresponding eigenvalue for perfect consistency:

$$Aw = \begin{bmatrix} 1 & w_1/w_2 & \cdots & w_1/w_n \\ w_2/w_1 & 1 & \cdots & w_2/w_n \\ \vdots & & \ddots & \vdots \\ w_n/w_1 & w_n/w_2 & \cdots & w_n/w_n \end{bmatrix} \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{bmatrix} = \begin{bmatrix} nw_1 \\ nw_2 \\ \vdots \\ nw_n \end{bmatrix} = n \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_n \end{bmatrix}$$

It can be shown that if A is perfectly consistent, n is the largest eigenvalue of A (i.e. $\lambda_{max} - n = 0$, then $CI = 0$, $CR = 0$), and if not perfectly consistent, the largest eigenvalue λ_{max} is larger than n. The deviation of λ_{max} from n is an indicator of the inconsistency of the comparison matrix A. When $CR > 0.1$, the judgments are called inconsistency.

Consistency ratio *(CR)* is used for measuring the consistency of pairwise comparison:

Consistency index: $CI = (\lambda_{max} - n) / (n - 1)$

Consistency ratio: $CR = CI / ACI$

where *ACI* is the average consistency index for a large number of random matrices, which can be looked up from Table 4.6 directly.

Table 4.6

Table of random inconsistency for different size matrix

N	Random Consistency Index (RI)
1	0
2	0
3	0.58
4	0.90
5	1.12
6	1.24
7	1.32
8	1.41
9	1.45
10	1.49

In this study, *ExpertChoice 2000* software aids the researcher to examine the consistency (*CR*) of pairwise judgment automatically. *ExpertChoice 2000* software has been written to compute the weights and rank child indicators of tourist risks after data input.

Step 3: Compute the general weights of all respondents

Based upon the weights of all individuals, one purpose of this study is to gather a set of general weights of all respondents as a representative of Chinese mainland tourists' opinion. It is calculated through simple averaging of individual's weights.

For Fuzzy MCDM, most of the computations are performed manually.

Fuzzy MCDM can be conducted in 4 steps:

Step 1: Corresponding risk evaluations to fuzzy

In this study, the researcher designed the safety satisfaction levels on a scale of 0 ~ 100, where "100" means a perfect satisfaction, while "0" means a worst-case satisfaction. The linguistic values of "very dissatisfied", "dissatisfied", "fair", "satisfied", "very satisfied" are indicated by triangular fuzzy numbers accordingly within the scale range of 0 ~ 100. Respondents evaluate the safety of three destinations by choosing natural language of "very satisfied", "satisfied", "fair", "dissatisfied", and "very dissatisfied". Finally, these natural languages are corresponded to their fuzzy triangular numbers by the researcher.

The researcher takes E_{ij}^{k} to indicate the fuzzy performance value of the evaluator k towards alternative i under criterion j, and all of the evaluation criteria are indicated by set S.

$$E_{ij}^{k} = (LE_{ij}^{k}, ME_{ij}^{k}, HE_{ij}^{k}), \quad j \in S, i \in C$$

Note:

S = *{transportation, law & order, hygiene, accommodation, weather, sightseeing location, medical support}*

C = *{Thailand, Malaysia, Singapore}*

Step 2: Calculating average value to integrate the fuzzy judgment values of m evaluators

According to the nature of triangular fuzzy numbers and the extension principle put forward by Zadeh 1965, if 2 TFNs (triangular fuzzy numbers) are given:

$$A = (a_1, a_2, a_3), \quad B = (b_1, b_2, b_3)$$

then,

Addition & Subtraction: $A \pm B = (a_1 \pm b_1, a_2 \pm b_2, a_3 \pm b_3)$

Multiplication: $A \times B = (a_1 \times b_1, a_2 \times b_2, a_3 \times b_3)$

Division: $A \div B = (a_1 \div b_1, a_2 \div b_2, a_3 \div b_3)$

therefore,

$$E_{ij} = (1/m) \times (E_{ij}^{1} + E_{ij}^{2} + \ldots + E_{ij}^{m}) = (LE_{ij}, ME_{ij}, HE_{ij})$$

or, the average triangular fuzzy numbers:

$$E_{ij} = (LE_{ij},\ ME_{ij},\ HE_{ij})$$

Note:

- *m = sample size*
- *Calculation is under the rules of fuzzy number multiplication and addition*

Step 3: Fuzzy synthetic decision

Weighting and unweighting would produce different index scores in this case.

From the weight vector W and fuzzy performance matrix E, the fuzzy synthetic decision can be conducted to get the result of matrix R, that is:

$$R = E \circ W$$

Note: "∘" indicates the calculation of the fuzzy numbers, including fuzzy addition and fuzzy multiplication

Here, approximate multiplied result of the fuzzy multiplication denotes the calculation. If the approximate fuzzy number of the fuzzy synthetic decision of each destinations is expressed by R_i, then:

$$R_i = (LR_i, MR_i, HR_i), \quad \forall\, i$$

$$R_i = \left(\sum_{j=1}^{n} LE_{ij} * W_j,\ \sum_{j=1}^{n} ME_{ij} * W_j,\ \sum_{j=1}^{n} HE_{ij} * W_j\right)$$

Note:

- $n = 7$
- *"$\forall$" means "for all" or "for each"*
- *Calculation is under the rule of multiplication of matrices*
- *Taking approximate multiplied result of fuzzy multiplication*

Step 4: Defuzzifying and ranking fuzzy numbers

The result of fuzzy synthetic decision of each alternative is still triangular fuzzy numbers. So it is necessary to employ nonfuzzy ranking method. Thus, a defuzzification method should then be applied to determine the order of the objectives. In other words, the procedure of defuzzification is to locate the Best Nonfuzzy Performance value *(BNP)* to this step. The *BNP* value of the fuzzy number R_i can be found by the following formula (i.e. COA method):

$$BNP_i = [(HR_i - LR_i) + (MR_i - LR_i)] / 3 + LR_i, \quad \forall i$$

As a sequence, according to the value of the derived *BNP* figures, ranking of the tourist risk intensity of three destinations can then be done. Even for each destination, the seven safety aspects can also be ranked.

CHAPTER V

DATA ANALYSIS

Data analysis is the application of logic to understand and interpret the data. Chapter five deals with analysis of collected data about the subject. It includes two parts. They are profile of the sample and test of hypothesis result.

5.1 Profile of the sample

Forty Chinese mainland tourists were selected as survey samples.

Guided by designed sample plan, data collection was carried out in two cities, Hangzhou (35 respondents) and Bangkok (5 respondents). The respondents conformed to the elements of higher education and specific travel experience of visiting Thailand, Malaysia and Singapore.

From checking the consistent ratio *(CR)* of weighting safety factors, it was suggested that 8 of the 40 should be rejected because their *CR* were more than 0.1 (*Note:* 7 of the Hangzhou's, 1 of the Bangkok's). This is a normal phenomenon for using pairwise comparison to evaluate multiple criteria. As a result, there are 32 usable samples, 28 of which coming from Hangzhou and 4 of which coming form Bangkok.

5.2 Test of hypothesis result

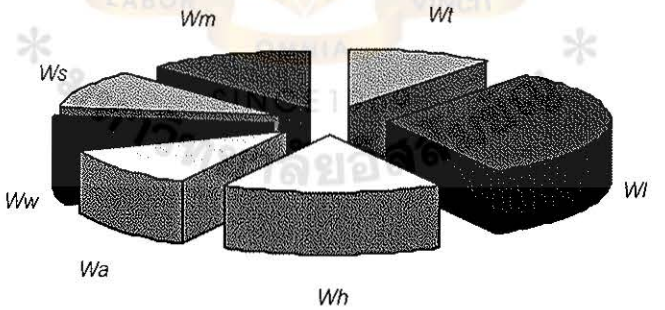
5.2.1 Tourism safety factors weighting

The analysis can be completed by using mean value of each respondent.

The overall importance weighting of tourism safety components is the simple average mean of the 32 respondents' individual weightings (see Appendix D) that are calculated through the AHP computer software.

As a profile of Chinese mainland tourists' perception, the hierarchy of the safety components is revealed in Figure 5.1.

Figure 5.1 Weights of tourism safety components



where

Transportation (Wt) = 0.106

Law & Order (Wl) = 0.313

Hygiene (Wh) = 0.159

Accommodation (Wa) = 0.114

Weather (Ww) = 0.079

Sightseeing location (Ws) = 0.110

Medical support (Wm) = 0.119

$$Wt + Wl + Wh + Wa + Ww + Ws + Wm = 1$$

Chinese mainland tourists deem law and order safety as the most important (Wl = 0.313). Hygiene safety also ranked highly (Wh = 0.159). It is followed in importance by safety of medical support (Wm = 0.119), accommodation (Wa = 0.114), sightseeing location (Ws = 0.110), and transportation (Wt = 0.106) sequentially. Weather safety (Ww = 0.079) is ranked the lowest.

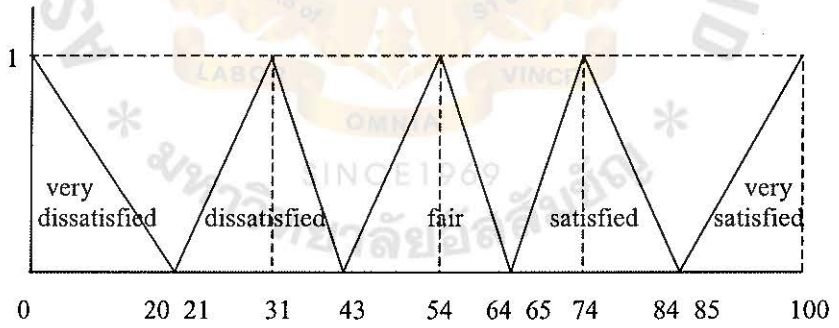
5.2.2 Membership function of evaluators

The 32 individuals' subjective cognition, or ranges of the five-level linguistic variables are listed in Appendix E. Their average values are:

range 1	range 2	range 3	range 4	range 5
Very dissatisfied	Dissatisfied	Fair	Satisfied	Very satisfied
(0, 0, 20)	(21, 31, 43)	(43, 54, 64)	(65, 74, 84)	(85, 100, 100)

From the average subjective cognition of respondents, as shown above, a general membership function of the five levels of linguistic variables of Chinese mainland tourists is discovered (seeing Figure 5.2). It is hoped the average membership function will be applicable to future studies that are also from fuzzy perspective.

Figure 5.2 The average membership function of the five levels of linguistic variables



Moreover, for the values of each column of Appendix E, the maximum value and the minimum value of that can be found. Thus, of the 32 respondents, the maximum and minimum figures of each kind of fuzzy numbers are picked out (Table 5.1). It contrasts the divergent understandings of respondents with respect to the same linguistic variable. That is the reason why this study intends to get the average subjective cognition.

Table 5.1

Maximum and minimum figures of fuzzy numbers of satisfaction cognition

		The maximum	The minimum
Very satisfied	lowest number	100	100
	moderate number	100	100
	highest number	95	80
Satisfied	lowest number	81	60
	moderate number	85	70
	highest number	90	80
Fair	lowest number	60	30
	moderate number	70	45
	highest number	80	60
Dissatisfied	lowest number	36	10
	moderate number	48	20
	highest number	60	30
Very dissatisfied	lowest number	0	0
	moderate number	0	0
	highest number	35	10

5.2.3 Fuzzy performance values of destinations

Simple average method is used to integrate the fuzzy judgment values of the 32 evaluators. With respect to the seven criteria, the average fuzzy performance values of each destination are as follows:

Table 5.2

Average fuzzy performance values of each criterion of destinations

	Thailand	Malaysia	Singapore
Transportation	(52, 62, 72)	(53, 62, 72)	(59, 70, 79)
Law & Order	(47, 57, 67)	(52, 62, 72)	(57, 68, 77)
Hygiene	(41, 54, 66)	(44, 54, 64)	(57, 69, 79)
Accommodation	(47, 56, 66)	(48, 57, 67)	(58, 69, 78)
Weather	(50, 61, 71)	(48, 58, 69)	(58, 69, 78)
Sightseeing location	(49, 59, 70)	(51, 62, 72)	(58, 69, 78)
Medical support	(50, 59, 70)	(50, 60, 70)	(58, 69, 78)

5.2.4 Evaluation results

5.2.4.1 Ranking general safety of destinations / hypotheses testing

The fuzzy synthetic decision of each destination (R_i) is calculated considering the weights. Then, through defuzzyfication, the fuzzy synthetic decision numbers (i.e. still triangular fuzzy numbers) are transformed to single figures so as to be compared and ranked easily.

As shown in Table 5.3, the BNP_i numbers (Best Nonfuzzy Performance values) are: Thailand, 58.242; Malaysia, 59.667; Singapore, 68.127. The comparison of the BNP_i numbers reveals that: $S_S > S_M > S_T$ (68.127>59.667>58.242). It can be interpreted that, for these three destinations, considering weightings, Chinese mainland tourists think that Singapore is the safest; Malaysia is ranked second, slightly higher than third placed Thailand.

Table 5.3

Evaluation results of general tourism safety of destinations

Destinations	R_i	BNP_i
Thailand	(47.390, 57.395, 67.942)	**58.242**
Malaysia	(49.714, 59.604, 69.683)	**59.667**
Singapore	(57.636, 68.793, 77.952)	**68.127**

Therefore, hypothesis 7 is accepted, while other hypotheses are rejected, as shown in Table 5.4.

Table 5.4

Outcomes of hypotheses testing

Hypotheses	Outcomes
H_1: $S_T > S_M > S_S$	Rejected
H_2: $S_T > S_S > S_M$	Rejected
H_3: $S_T > S_M = S_S$	Rejected
H_4: $S_M > S_T > S_S$	Rejected
H_5: $S_M > S_S > S_T$	Rejected
H_6: $S_M > S_S = S_T$	Rejected
H_7: $S_S > S_M > S_T$	Accepted
H_8: $S_S > S_T > S_M$	Rejected
H_9: $S_s > S_M = S_T$	Rejected
H_{10}: $S_T = S_M = S_S$	Rejected
H_{11}: $S_M = S_S > S_T$	Rejected
H_{12}: $S_T = S_M > S_S$	Rejected
H_{13}: $S_T = S_S > S_M$	Rejected

5.2.4.2 Ranking destination safety on each component

It is also possible to compare each safety component of these three destinations besides comparison of their general safety. Based on the BNP_{ij} numbers of the three destinations under the same criterion (R_{ij}), which are shown in Table 5.5, Table 5.6, and Table 5.7, the comparison of the three destinations' safety on each item can be made (*Note: "i"* refers to the set of various safety criteria, *"j"* refers to the set of different destinations). For example, focusing on safety of hygiene, the BNP_{ij} number of Thailand is "8.321", while that of Malaysia is "8.586" and that of Singapore is "10.865". Hence, the ranking order of hygiene safety of these three destinations is: Singapore, Malaysia, and Thailand. Similarly, other components can be ranked separately.

Table 5.5

Evaluation results of Thailand's tourism safety on each component

Component	R_{ij}	BNP_{ij}
Transportation	(5.512, 6.572, 7.632)	6.572
Law & Order	(14.711, 17.841, 20.971)	17.841
Hygiene	(6.519, 8.268, 10.176)	8.321
Accommodation	(5.358, 6.384, 7.524)	6.422
Weather	(3.950, 4.819, 5.609)	4.793
Sightseeing location	(5.390, 6.490, 7.700)	6.527
Medical support	(5.950, 7.021, 8.330)	7.100

Table 5.6

Evaluation results of Malaysia's tourism safety on each component

Component	R_{ij}	BNP_{ij}
Transportation	(5.618, 6.572, 7.632)	6.607
Law & Order	(16.276, 19.406, 22.536)	19.406
Hygiene	(6.996, 8.586, 10.176)	8.586
Accommodation	(5.472, 6.498, 7.638)	6.536
Weather	(3.792, 4.582, 5.451)	4.608
Sightseeing location	(5.610, 6.820, 7.920)	6.783
Medical support	(5.950, 7.140, 8.330)	7.140

Table 5.7

Evaluation results of Singapore's tourism safety on each component

Component	R_{ij}	BNP_{ij}
Transportation	(6.254, 7.420, 8.374)	7.349
Law & Order	(17.843, 21.284, 24.101)	21.076
Hygiene	(9.063, 10.971, 12.561)	10.865
Accommodation	(6.612, 7.866, 8.892)	7.790
Weather	(4.582, 5.451, 6.162)	5.398
Sightseeing location	(6.380, 7.590, 8.580)	7.517
Medical support	(6.902, 8.211, 8.282)	8.132

As a result, for transportation safety, law & order safety, hygiene safety, accommodation safety, sightseeing location safety, and medical support safety, Singapore is the leader, Malaysia stands second, and Thailand in third. Whist for weather safety, the ranking order is "Singapore, Thailand, and Malaysia".

Explanation of safety ranking orders of destinations in general and on each component (5.2.4.1 & 5.2.4.2):

Singapore is perceived as the safest destination.

Firstly, a feature of Singapore is its strict and transparent legislation system. Evidently, it helps Singapore gain higher scores than the other two in this field. Furthermore, law and order system is the foundation and device that can influence the safety situation of many other social aspects. This may be a hint to why Singapore can be praised in many other aspects as well as in general.

Secondly, Singapore is a developed country, whose GDP per capita was US$20,700 in 2001. The true economic development is usually considered to contribute to the increased provision and quality of health, general infrastructure, environmental protection, social civilization, government and commercial transparency and accountability, and so forth. Tourism safety is supported by all these social factors.

Thirdly, Singapore is a city-state. Mainland Chinese tourists' average length of stay in Singapore is hardly more than 1 day (Wang, 2002). The short period of stay may reduce the possibility of risk taking there.

Malaysia is perceived as the second safest destination.

Firstly, Malaysia is a Muslim country. Islam is the official religion although Buddhism, Hinduism, Christianity and other religions are practiced freely. To some extent, the strict religious rules of Islam may help Malaysia to keep good social order. However, physical attacks, scams and theft have been known to occur on some sightseeing spots.

Secondly, Malaysia's economic level can be evidenced by the US$3,696 GDP per capita of 2001, which is lower than Singapore, but ahead of Thailand. Similarly, it may indicate why Malaysia's tourism safety level stands in the middle of Singapore and Thailand.

Thailand is perceived riskiest relatively.

Thailand is a Buddhism country. This religion may also have helped Thailand keeping good social order.

Unlike western tourists, the vast majority of Mainland Chinese traveling abroad are with groups, which are organized by travel agencies. But the "zero-dollar tours" and even "minus-dollar tours" are commonplace in Thailand, which may have affected Chinese mainland tourists' safety satisfaction. Chinese mainland tourist have been exploited and cheated by the likes of unlicensed or unethical guides, touts, and souvenir and jewelry shops. This may be one of the reasons that Chinese mainland tourists perceived higher risk in Thailand. Moreover, for some Chinese tour groups to Southeast Asia, the tour leaders often give alerts to tourists that Thailand is not safe enough, which should have damaged the tourists' first impression about Thailand.

Secondly, the image of Thailand from abroad as a sex tourism destination, spread by media such as *Time* magazine, may has ruined Thailand's safety image (Image problem: PM lashes out at 'Time', 2001).

"Weather" is a natural factor. The weather change and possibility of natural disasters cannot be controlled by human beings. Tourists' perceived weather safety is dependent on the weather condition when they visited the destination.

5.2.4.3 Ranking safety of seven components toward each destination

For each destination, the safety of transportation, law and order, hygiene, accommodation, weather, sightseeing location, and medical support can be compared and ranked. It should ignore the influence of "weight". The *BNP* numbers without weight combination are denoted by *BNP'* here.

Table 5.8 shows the *BNP'* of Thailand towards seven safety components.

Table 5.8

Evaluation results of safety components of Thailand (excluding "weight")

Component	Average fuzzy performance values	*BNP'*
Transportation	(52, 62, 72)	62.00
Law & Order	(47, 57, 67)	57.00
Hygiene	(41, 54, 66)	53.67
Accommodation	(47, 56, 66)	56.33
Weather	(50, 61, 71)	60.67
Sightseeing location	(49, 59, 70)	59.33
Medical support	(50, 59, 70)	59.67

For Thailand, the safety of these seven components can be ranked in declining order: transportation, weather, medical support, sightseeing location, law & order, accommodation, and hygiene.

Table 5.9 shows the *BNP'* of Malaysia towards seven safety components.

Table 5.9

Evaluation results of safety component of Malaysia (excluding "weight")

Components	Average fuzzy performance values	*BNP'*
Transportation	(53, 62, 72)	62.33
Law & Order	(52, 62, 72)	62.00
Hygiene	(44, 54, 64)	54.00
Accommodation	(48, 57, 67)	57.33
Weather	(48, 58, 69)	58.33
Sightseeing location	(51, 62, 72)	61.67
Medical support	(50, 60, 70)	60.00

For Malaysia, the safety of these seven components can be ranked in declining order: transportation, law and order, sightseeing location, medical support, weather, accommodation, and hygiene.

Table 5.10 shows the *BNP'* of Singapore towards seven safety components.

Table 5.10

Evaluation results of each component of Singapore (excluding "weight")

Components	Average fuzzy performance values	*BNP'*
Transportation	(59, 70, 79)	69.33
Law & Order	(57, 68, 77)	67.33
Hygiene	(57, 69, 79)	68.33
Accommodation	(58, 69, 78)	68.33
Weather	(58, 69, 78)	68.33
Sightseeing location	(58, 69, 78)	68.33
Medical support	(58, 69, 78)	68.33

For Singapore, transportation safety receives the highest score in the assessment. Safety performances of hygiene, accommodation, weather, sightseeing location, and medical support are almost at the same level. While law and order safety is fractionally lower. However, it should be noted that the differences between these *BNP'* numbers are quite small.

Explanation:

Transportation safety is ranked first for all the destinations. This may be because these destinations have developed traffic infrastructure and telecommunication facilities in recent years to support better-established tourism industries. The improvements in airport facilities and the development of the self-contained resort complex are the highlights.

For Thailand and Malaysia, although enjoying a good standard of health and cleanliness, except for the usual rules for healthy living in a tropical environment, hygiene safety is ranked last. This may be because of the higher possibility of contracting infectious diseases such as malaria, dengue fever and so forth in these two countries. For example, malaria is fast becoming one of the top public-health problems in both Thailand and Malaysia. Also, the Chinese government gave alerts to citizens that dengue fever was epidemical in Thailand and Malaysia. Contrarily, Singapore is not a malarial area and the tap water is safe to drink.

For Singapore, because the range of "performance" index is quite small, only 2 units of difference (77.33~69.33), it is difficult to make exact distinctions between them. It should be said that the safety situation of almost all these components are satisfactory.

5.2.4.4 Safety "importance-performance" analysis for each destination

Importance-performance (IP) analysis is considered to be an effective management tool. From a marketing perspective, importance-performance analysis is intended to assist marketers in developing strategies that highlight potential benefits to tourists.

Interpreting the importance-performance grid into action is a fairly straightforward exercise. Each quadrant can be summarized into specific directions for management. The upper-right quadrant indicates issues of great importance to tourists and excellent performance shown by the destination, indicating that tourists are pleased with the safety work performed ("Keep Up The Good Work"). In the upper-left quadrant, important issues are not being handled well and demand immediate attention ("Concentrate Here"). In the bottom-right quadrant, are issues of lesser importance that are performed well, which might be considered for less emphasis ("Possible Overkill"), but they are just material for publicity marketing due to their competitive advantages compared to others. While in the bottom-left quadrant, low performance on unimportant issues may receive a little more effort ("Low Priority").

This importance-performance analysis is based on the comparison of seven components together with the importance weights. The axes of grids use the scales or scores provided from evaluators to place each variable in position. Here, the importance scales come from the AHP analysis, the performance scales are arrived at from Fuzzy MCDM evaluation. Performance variables are placed on the vertical axis and importance measures are placed on the horizontal axis.

Figure 5.3, Figure 5.4, and Figure 5.5 are the matrices revealing the relationship between importance and performance of safety components of Thailand, Malaysia, and Singapore, respectively.

Note:

- mean score of importance weights:

  1 / 7 = 0.143 (because the sum of sub-weights is 1)

- mean score of safety performance of Thailand:

  (62.00+57.00+53.67+56.33+60.67+59.33+59.67) / 7 = 58.38

- mean score of safety performance of Malaysia:

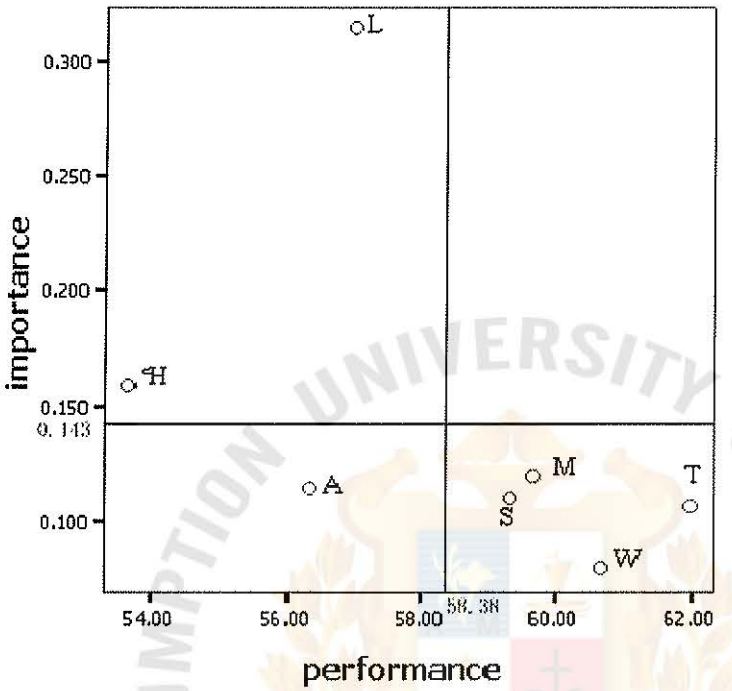
  (62.33+62.00+54.00+57.33+58.33+61.67+60.00) / 7 = 59.38

- mean score of safety performance of Singapore:

  (69.33+67.33+68.33+68.33+68.33+68.33+68.33) = 68.33

- "T" stands for transportation safety
- "L" stands for law & order safety
- "H" stands for hygiene safety
- "A" stands for accommodation safety
- "W" stands for weather safety
- "S" stands for sightseeing location safety
- "M" stands for medical support safety

Figure 5.3 Importance-performance matrix of Thailand tourism safety

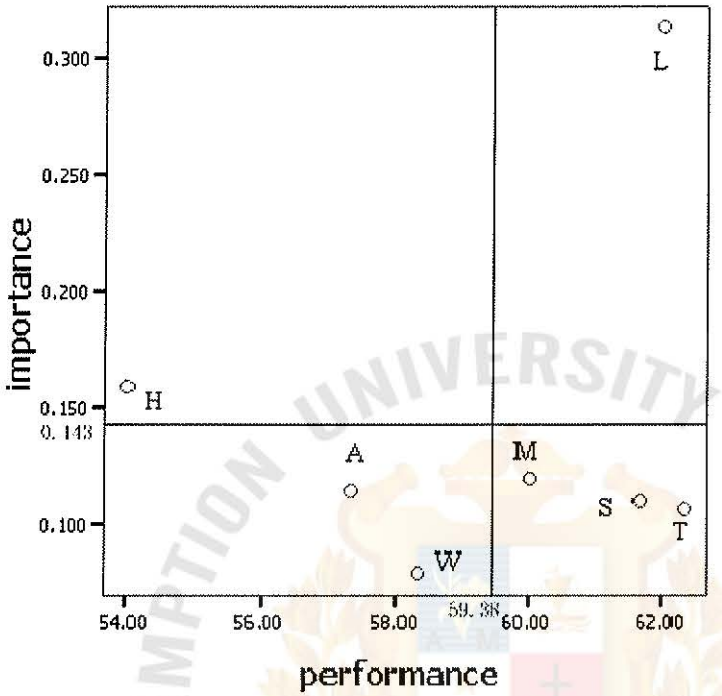


For Thailand:

Requires urgent action to improve the safety performances of law & order and hygiene.

Safety performances of transportation, medicine support, sightseeing location, and weather have competitive advantages compared to other components.

Figure 5.4 **Importance-performance matrix of Malaysia tourism safety**

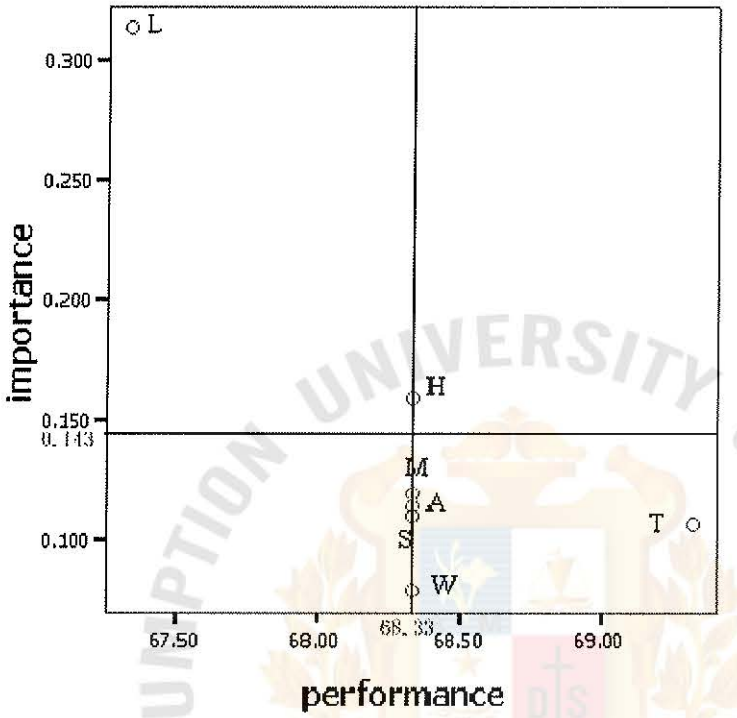


For Malaysia:

Hygiene safety demands immediate attention.

Safety performances of transportation, medical support, and sightseeing location own competitive advantages, relatively.

Figure 5.5 **Importance-performance matrix of Singapore tourism safety**

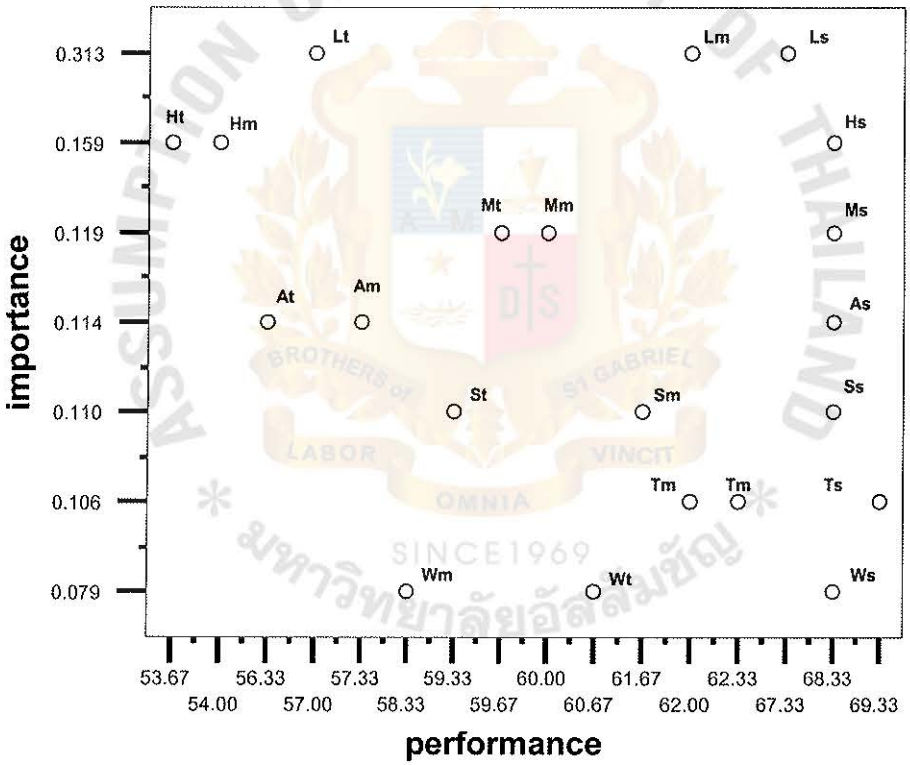


For Singapore:

Safety performances of hygiene, medical support, accommodation, and weather are almost at the same average level. Safety of transportation has a slight competitive advantage.

Figure 5.6 reveals the overall scenario of importance-performance assessment of these three destinations, with the unified indexes on the ordinate and abscissa. It can be used to quickly view and comprehend Chinese mainland tourists' post-trip perception of safety. In particular, this figure can assist the understanding of Singapore tourism safety.

Figure 5.6 Importance-performance analysis of three destinations



5.2.4.5 Data analysis of two sample groups

Because the data were collected in two cities (i.e. Hangzhou and Bangkok), it is necessary to analyze them separately to check if there are deviations with respect to the hypotheses and other conclusions.

Among the 32 usable questionnaires, there were 28 collected in Hangzhou (i.e. respondents 1~28) and 4 (respondents 29 ~ 32) collected in Bangkok.

Table 5.11 and Table 5.12 show the average fuzzy performance values of respondent groups of Hangzhou and Bangkok, respectively.

Table 5.11

Average fuzzy performance values of each criterion of destinations (Hangzhou group)

	Thailand	Malaysia	Singapore
Transportation	(52, 62, 72)	(50, 60, 70)	(58, 69, 78)
Law & Order	(46, 56, 66)	(51, 61, 71)	(56, 67, 76)
Hygiene	(39, 51, 64)	(43, 53, 64)	(57, 69, 78)
Accommodation	(44, 54, 64)	(46, 55, 65)	(56, 67, 77)
Weather	(49, 59, 69)	(47, 57, 68)	(57, 67, 76)
Sightseeing location	(46, 57, 67)	(48, 59, 70)	(56, 67, 76)
Medical support	(47, 56, 68)	(47, 57, 68)	(57, 68, 77)

Table 5.12

Average fuzzy performance values of each criterion of destinations (Bangkok group)

	Thailand	Malaysia	Singapore
Transportation	(52, 60, 68)	(70, 78, 86)	(70, 78, 86)
Law & Order	(58, 67, 74)	(60, 71, 81)	(70, 78, 86)
Hygiene	(48, 57, 64)	(48, 59, 69)	(60, 70, 81)
Accommodation	(63, 72, 79)	(63, 72, 79)	(70, 78, 86)
Weather	(60, 70, 81)	(55, 65, 76)	(70, 78, 86)
Sightseeing location	(70, 78, 86)	(70, 78, 86)	(75, 83, 89)
Medical support	(70, 78, 86)	(70, 78, 86)	(70, 78, 86)

Table 5.13 and Table 5.14 show the two respondent groups' evaluation about the general tourism safety of the three destinations, respectively. Both of the results are the same as the result of the whole sample analysis (i.e. 32 respondents). In other words, hypothesis 7 ($S_S > S_M > S_T$) is also proved acceptable through the sub-sample analyses.

Table 5.13

Evaluation result of general tourism safety of destinations (Hangzhou group)

Destinations	R_i	BNP_i	Comparison
Thailand	(59.250, 67.994, 75.645)	**67.630**	
Malaysia	(61.389, 71.077, 80.144)	**70.870**	$S_S > S_M > S_T$
Singapore	(68.960, 77.278, 85.535)	**77.258**	

Table 5.14

Evaluation result of general tourism safety of destinations (Bangkok group)

Destinations	R_i	BNP_i	Comparison
Thailand	(45.651, 56.255, 66.675)	**56.194**	
Malaysia	(47.930, 57.838, 68.393)	**58.054**	$S_S > S_M > S_T$
Singapore	(56.569, 67.649, 76.763)	**66.994**	

Table 5.15 reveals the Best Nonfuzzy Performance values and the comparisons of respondents of Hangzhou group, toward the three destinations' tourism safety under the seven criteria. Table 5.16 shows the Best Nonfuzzy Performance values and the comparisons of respondents of Bangkok group, toward the three destinations' tourism safety under the seven criteria. Both of the comparison results below (i.e. Table 5.15

and Table 5.16) reflect that Singapore is almost in first rank in terms of each component (except the evaluation of "transportation" & "medical support" of Bangkok group), as the same result as that of whole sample analysis. Malaysia and Thailand rank differently, in terms of these components, while evaluated by the different respondent groups. It may imply that the difference between these two destinations' general tourism safety is slight, which can be evidenced by their *BNP* values (BNP_i).

Table 5.15

Best Nonfuzzy Performance values of the three destinations' tourism safety on each component (Hangzhou group)

Component	BNP_{ij}			Comparisons
	Thailand	Malaysia	Singapore	
Transportation	6.572	6.360	7.243	S>T>M
Law & Order	17.528	19.093	20.762	S>M>T
Hygiene	8.162	8.480	10.812	S>M>T
Accommodation	6.156	6.308	7.600	S>M>T
Weather	4.661	4.529	5.267	S>T>M
Sightseeing location	6.233	6.490	7.297	S>M>T
Medical support	6.783	6.823	8.013	S>M>T

Table 5.16

Best Nonfuzzy Performance values of the three destinations' tourism safety on each component (Bangkok group)

Component	BNP_{ij}			Comparisons
	Thailand	Malaysia	Singapore	
Transportation	6.360	8.274	8.274	S=M>T
Law & Order	20.762	22.119	24.414	S>M>T
Hygiene	8.957	9.328	11.183	S>M>T
Accommodation	8.132	8.132	8.892	S>M=T
Weather	5.556	5.161	6.162	S>T>M
Sightseeing location	8.580	8.580	9.057	S>M=T
Medical support	9.282	9.282	9.282	S=M=T

CHAPTER VI

CONCLUSION & RECOMMENDATION

This chapter includes three parts, which are summary of findings, implications of the study, and recommendations of the researcher.

6.1 Summary of findings

This study focused on Chinese mainland tourists' evaluation of perceived risks on destinations of Thailand, Malaysia and Singapore. The framework was developed from the previous research of Tsaur et al. (1997) who had carried out research on measuring tourist risk. The researcher of this study attempted to operationalize and evaluate tourist risk using Analytic Hierarchy Process and Fuzzy Multiple Criteria Decision-making. The comparative importance of risk criteria could be measured accurately through pairwise comparison. The uncertainty of tourist risk was dealt with under a fuzzy environment to render it more objective and practicable for evaluation. The major limitation of this study is the probable generalization problem.

For the cognition of importance of tourist risk, the highest attention is given to law & order safety. From the most important to the least, the hierarchy of seven safety components is: law & order safety, hygiene safety, medical support safety,

accommodation safety, sightseeing location safety, transportation safety, and weather safety.

In general, Singapore is regarded as the safest one among the selected destinations, followed by Malaysia and Thailand (i.e. hypothesis 7 is accepted).

Focusing on the data analysis of the whole sample (i.e. 32 respondents), other relevant conclusions can be drawn as the statement below.

Ranking destinations' safety performance on each component, for transportation safety, law & order safety, hygiene safety, accommodation safety, sightseeing location safety, and medical support safety, Singapore stands in first position, Malaysia in second, and Thailand in third. While for safety of weather, Singapore is first, Thailand is second, and Malaysia is third.

As for each destination, if safety weights are not considered, the safety situation of the seven components can be ranked in declining order as follows:

Thailand - transportation, weather, medical support, sightseeing location, law & order, accommodation, and hygiene.

Malaysia - transportation, law & order, sightseeing location, medical support, weather, accommodation, and hygiene.

Singapore - Transportation safety is first. Safety performances of hygiene, accommodation, weather, sightseeing location, and medical support are almost at the same level, followed by law & order safety. But the differences between all these components are minimal.

As for assessing the relationship between importance and performance of safety components of each destination, the findings are as follows:

For Thailand, safety performance of law & order and hygiene need urgent improvement; safety performances of transportation, medical support, sightseeing location, and weather have competitive advantages compared to others.

For Malaysia, hygiene safety demands immediate attention. Safety performances of transportation, medical support, and sightseeing location are with competitive advantages.

For Singapore, almost all of the safety factors are satisfactory.

6.2 Implications

The primary purpose of this research was to study Chinese mainland tourists' perceived risk, and the results of the study would show guidelines for the tourism industry and governments to lay the groundwork for risk reduction.

Since tourists regard law and order safety as the most important element, the destinations need to create political stability, reduce possibility of criminal attacks, and enhance the friendly attitude of inhabitants towards tourists.

Legislation and its enforcement are crucial. Sound laws, coupled with strict and transparent enforcement will pave the way for the legality and order of other operations. Moreover, it is strongly believed that the ultimate reason of acts of crime against tourists is caused by wider social and political motives. Specifically, "tourism-oriented crime" refers to crime committed by locals against tourists. There is no doubt

that crimes such as robbery, theft, fraud, rape, unlicensed guides and touting are chronic social diseases that often victimize tourists. As a result it threatens the very existence and well being of the tourism industry.

After the tragedy of Bali bomb blast on October 12, 2002, Southeast Asia became a possible target of terrorist attacks. Many countries issued warnings to their citizens of heightened risk alerts in most ASEAN countries including Thailand, Malaysia, and Singapore. Malaysia has even been branded from "tourist-risk" state to "terrorist suspect" state. This kind of image is highly detrimental to future tourism prospects. It is a grave national problem. In order to restore confidence, Southeast Asia must be seen to stand in the anti-terrorism frontline, and give more urgency to deepen tourism cooperation in security matters.

Chinese mainland tourists also give hygiene safety high attention. Yet for both Thailand and Malaysia, the hygiene safety is evaluated as poor compared to other aspects, as well as to that of Singapore. This information should alert both Thailand and Malaysia that hygiene improvements are needed immediately.

6.3 Recommendations

Suggestions for government

Of the destination safety, "law and order" safety is the most important variable for Chinese mainland tourists.

Regional and international cooperation on a government level seeking risk reduction, such as seeking preventive measures to reduce the negative effect of terrorism, should be promoted and institutionalized. Such needs have become more relevant in recent years as tourists occasionally become a direct target for extremists and terrorist groups.

The majority of Chinese mainland tourists traveling to Southeast Asia are in group-arrangements, and the so called "zero-dollar tours" have damaged the law and order safety perceived by Chinese mainland tourists. Governments should step up efforts to prevent Chinese tourists from being cheated by "zero-dollar tours". The "zero-dollar Chinese tours" have existed in Thailand for several years, which have even "developed" to minus-dollar Chinese tours. Unfortunately, this trick is also penetrating into Singapore and Malaysia, with travel agencies and travel operators in Singapore and Malaysia recently practicing "zero-dollar tours". If they continue, it will become a serious problem for Southeast Asia tourism. This strategy can help tourism business enterprises to lure more Chinese mainland tourists, due to the low price, but it will raise tourist risk and lead to negative effect to national and regional tourism industry. For example, according to the "2001 statistical report of tourism", it had resulted in a 9% reduction of Chinese mainland tourists to Thailand in 2000, as tourists feared the uncertain factors and cheating traps (Tourism Authority of Thailand, 2002). Of course, it is not fair to blame the destinations only. The travel agencies of generator (China) do play a role in this game. Hence, Thailand, Malaysia, and Singapore should supervise these kinds of business strategies; and improve cooperation with China in seeking the effective solution for this problem.

Singapore is a very safe country with low crime rates. To pursue higher tourism revenue, other than 1-day tour, the STB of Singapore is working on promoting 3-night-stay tourism products targeting Mainland China market. This may increase tourists' risk taking. So it is also important for the Singapore government to keep a close watch for possible unsafe factors such as zero-dollar tours and help people feel at ease.

Compared to Singapore, Thailand and Malaysia should perform much better on social order and law enforcement. Besides, Thailand and Malaysia also require better control of the preventive epidemic systems in order to diminish tourists' possibility of contracting infectious diseases. For Thailand, the research result shows that the possible hygiene problem is relatively serious. It may be rooted in the possibility of contracting the infectious diseases such as dengue fever, rabies, STDs and AIDS, which negatively affect the Chinese mainland tourists' perception and have influenced evaluators' judgment. For instance, the World Health Organization had reported that 4-7% of Bangkok's dogs were carrying rabies (World Health Organization, n.d., cited in Harcombe, 2001). For Malaysia, the East part is less developed compared to the Malaysia peninsular (i.e. West Malaysia), where hygienic conditions are rather poor.

Each destination should have safety components with competitive advantages. In terms of marketing promotion, these factors are well worth publicizing.

Suggestions for business

Tourism enterprises should take industry benefit, national benefit and regional benefit into account, and not only attend to company benefit. Though some marketing

and operating strategies such as "zero-dollar tour" system can make short-term profit, on the other hand, they may increase tourists' predicated and perceived risk, and harm sustainable development of national and regional tourism. It is an urgent requirement for Southeast Asia tourism industry to stop the price war and adopt more suitable marketing tools. Specifically, Thailand, as the leader of practicing "zero-dollar tour" or even "minus-dollar tour" systems, travel agencies and jewelry shops must give much more concern to ethical and societal marketing.

Catering sectors must follow government health controls and follow high-level hygiene standards. Other business enterprises such as accommodations, entertainments, sightseeing spots, and hospitals should also create a clean environment to avoid tourists contracting infectious diseases.

Furthermore, tourism enterprises must be consistently involved in research and evaluation of the effectiveness of risk prevention or minimization measures such as security hardware and security policies, in their properties. Meanwhile, collecting and keeping accurate and honest records of all incidences occurring on their properties is also useful. And for the benefit of the whole industry, these statistics and data should be shared with local and national law enforcement agencies.

Tourism enterprises should also implement physical security devices and behavioral security procedures for the attention of guest security. Both employers and employees need to be trained in safety and security measures.

Suggestions for future study

For future study, the researcher may wish to adjust the scope of the view of risk criteria and objectives for different research purposes. This study focused on "physical risk" and "equipment risk", and on tourists' experienced risk of specific destinations. As a further exploratory study, it can focus on tourists' pre-trip perception of risk; or on the whole process of consumer behavior, which is to say, to study tourists' predicted risk and perceived risk tracking the entire period of "pre-purchase -- purchasing -- post-purchase". The risk criteria can also be adjusted. For example, the combination of function risk, time risk, financial risk, social risk, physical risk, and psychological risk can be done. Besides, demographic factors can also be studied for the reasons of market segmentation and product positioning.

This study applied fuzzy logic in tourists' subjective cognition of five-level linguistic variables of satisfaction feelings. This cognition and its membership function were of general satisfaction feelings about tourism safety only. Further study could analyze tourists' satisfaction feelings towards each category of safety criteria from fuzzy perspective. As a result the membership functions of different safety factors could be developed. Those membership functions would be useful to measure tourists' satisfaction in data, in terms of various aspects such as transportation safety, law & order safety, hygiene safety, accommodation safety, weather safety, sightseeing location safety, medical support safety, and so forth.

Furthermore, given the non-probability sample, this analysis should not be considered as a definitive empirical test. Nevertheless, this exploratory effort provides several provocative findings that beg future research involving random samples.

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APPENDIX A

List of destinations with ADS (Approved Destination Status) for Chinese tour groups

List of destinations with ADS (Approved Destination Status) for Chinese tour groups

	ADS destinations	Approved in (year)
1	Australia	1997
2	Brunei	1999
3	Cambodia	1999
4	Egypt	2002
5	Germany	2002
6	Hong Kong SAR	1983
7	Indonesia	2000
8	Japan	1998
9	Korea, Republic of	1998
10	Laos	1999
11	Macao SAR	1983
12	Malaysia	1990
13	Malta	2002
14	Myanmar	1999
15	Nepal	2000
16	New Zealand	1997
17	Philippines	1992
18	Singapore	1990
19	Thailand	1998
20	Turkey	2002
21	Vietnam	1999

Annotation:

* Source: CNTA, updated in June, 02

* It is advised that when an ADS is first officially granted, it DOES NOT mean that the business of Chinese tour groups traveling to this destination automatically begins immediately. A detailed implementation plan is required to be drafted out before starting the business of sending Chinese tour groups to this destination.

APPENDIX B

Questionnaire (English version)

QUESTIONNAIRE

Dear Sir / Madam,

My name is Teng weifeng, a student of Master of Arts in Tourism Management from Assumption University (Thailand). As a part of my graduate studies, I am conducting my thesis of which the topic is "Chinese mainland tourists' evaluation about risks of destinations". This survey will be for academic purpose only and your cooperation will be very helpful to my study. Sorry to cost your precious time and thank you very much!

Section I

Please compare the importance of each pair of tourism safety factors. Which one is more important? (tick "√" in □). And how is the intensity of its importance compared to another? (reading show-card as reference and tick "√" under the number).

Q1: □ Transportation (*considering:* safety of transportation; convenience of telecommunication facilities; safety of driving)

□ Hygiene (*considering:* possibility of contracting infectious diseases; hygiene of catering conditions)

Important intensity: 1 2 3 4 5 6 7 8 9

Q2: □ Transportation (*considering:* safety of transportation; convenience of telecommunication facilities; safety of driving)

□ Law and Order (*considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist)

Important intensity: 1 2 3 4 5 6 7 8 9

Q3: ☐ Transportation (*considering:* safety of transportation; convenience of telecommunication facilities; safety of driving)
☐ Medical support (*considering*: the degree of assistance available in case of accident; the completeness of medical service system)
Important intensity: 1 2 3 4 5 6 7 8 9

Q4: ☐ Transportation (*considering:* safety of transportation; convenience of telecommunication facilities; safety of driving)
☐ Sightseeing location (*considering:* the safety to recreational facilities; the quality of the management staff)
Important intensity: 1 2 3 4 5 6 7 8 9

Q5: ☐ Transportation (*considering:* safety of transportation; convenience of telecommunication facilities; safety of driving)
☐ Weather (*considering*: the difference of weather change; the possibility of natural disasters)
Important intensity: 1 2 3 4 5 6 7 8 9

Q6: ☐ Transportation (*considering:* safety of transportation; convenience of telecommunication facilities; safety of driving)
☐ Accommodation (*considering*: hotel fire control system; hotel security system)
Important intensity: 1 2 3 4 5 6 7 8 9

Q7: ☐ Law and Order (*considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist)
☐ Hygiene (*considering:* possibility of contracting infectious diseases; hygiene of catering conditions)
Important intensity: 1 2 3 4 5 6 7 8 9

Q8: ☐ Law and Order (*considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist)
☐ Medical support (*considering*: the degree of assistance available in case of accident; the completeness of medical service system)
Important intensity: 1 2 3 4 5 6 7 8 9

Q9: □ Law and Order (*considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist)
□ Sightseeing location (*considering:* the safety to recreational facilities; the quality of the management staff)
Important intensity: 1 2 3 4 5 6 7 8 9

Q10: □ Law and Order (*considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist)
□ Weather (*considering*: the difference of weather change; the possibility of natural disasters)
Important intensity: 1 2 3 4 5 6 7 8 9

Q11: □ Law and Order (*considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist)
□ Accommodation (*considering*: hotel fire control system; hotel security system)
Importance intensity: 1 2 3 4 5 6 7 8 9

Q12: □ Hygiene (*considering:* possibility of contracting infectious diseases; hygiene of catering conditions)
□ Accommodation (*considering*: hotel fire control system; hotel security system)
Importance intensity: 1 2 3 4 5 6 7 8 9

Q13: □ Hygiene (*considering:* possibility of contracting infectious diseases; hygiene of catering conditions)
□ Weather (*considering*: the difference of weather change; the possibility of natural disasters)
Important intensity: 1 2 3 4 5 6 7 8 9

Q14: □ Hygiene (*considering:* possibility of contracting infectious diseases; hygiene of catering conditions)
□ Sightseeing location (*considering:* the safety to recreational facilities; the quality of the management staff)
Important intensity: 1 2 3 4 5 6 7 8 9

Q15: □ Hygiene (*considering:* possibility of contracting infectious diseases; hygiene of catering conditions)
□ Medical support (*considering*: the degree of assistance available in case of accident; the completeness of medical service system)
Important intensity: 1 2 3 4 5 6 7 8 9

Q16: □ Accommodation (*considering*: hotel fire control system; hotel security system)
□ Weather (*considering*: the difference of weather change;
the possibility of natural disasters)
Important intensity: 1 2 3 4 5 6 7 8 9

Q17: □ Accommodation (*considering*: hotel fire control system; hotel security system)
□ Sightseeing location (*considering:* the safety to recreational facilities;
the quality of the management staff)
Important intensity: 1 2 3 4 5 6 7 8 9

Q18: □ Accommodation (*considering*: hotel fire control system; hotel security system)
□ Medical support (*considering*: the degree of assistance available in case of accident; the completeness of medical service system)
Important intensity: 1 2 3 4 5 6 7 8 9

Q19: □ Weather (*considering*: the difference of weather change;
the possibility of natural disasters)
□ Sightseeing location (*considering:* the safety to recreational facilities;
the quality of the management staff)
Important intensity: 1 2 3 4 5 6 7 8 9

Q20: □ Weather (*considering*: the difference of weather change;
the possibility of natural disasters)
□ Medical support (*considering*: the degree of assistance available in case of accident; the completeness of medical service system)
Important intensity: 1 2 3 4 5 6 7 8 9

Q21: □ Sightseeing location (*considering:* the safety to recreational facilities;
the quality of the management staff)
□ Medical support (*considering*: the degree of assistance available in case of accident; the completeness of medical service system)
Important intensity: 1 2 3 4 5 6 7 8 9

SHOW-CARD

Evaluation Criteria for Pairwise Comparison of Safety Factors

Comparative importance/ Numerical Value	**Definition/ Verbal Terms**	**Explanation**
1	Equally important	A and B are of equal importance
3	Weakly more important	A is weakly more important than B
5	Strongly more important	A is strongly more important than B
7	Very strongly more important	A is very strongly more important than B
9	Extremely more important	A is extremely more important than B
2, 4, 6, 8	Intermediate judgment values	Judgment values between equally, moderately, strongly, very strongly, and extremely

Section II

Q22. As we evaluate tourism safety, usually, words of "Very satisfied", "satisfied", "fair", "dissatisfied", and "very dissatisfied" are applied. Define your own individual range for these linguistic variables within the scale of 0-100.

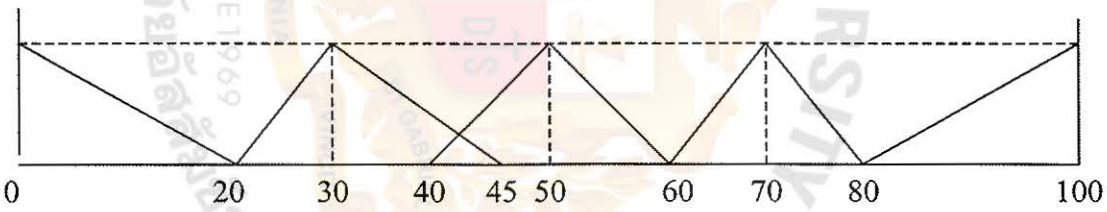
INSTRUCTIONS

For Theory: For example, if you make a judgment of a person's height. You think medium height of a man should be 1.70m favorably. But the minimum height can be 1.65m, while the maximum height can be 1.73m. So the linguistic description "medium height of men" will be represented as the range (1.65, 1.70, 1.73). i.e. (*minimum height, moderate height, maximum height)*.

For Questions: For example, this is one person's description about the 5 linguistic variables

Very Dissatisfied	*Dissatisfied*	*Fair*	*Satisfied*	*Very Satisfied*
(0, 0, 20)	*(20, 30, 45)*	*(40, 50, 60)*	*(60, 70, 80)*	*(80, 100, 100)*

Figured as:



Please put one number in the 1 & 5 boxes below which describe your feelings of being Very Satisfied and Very Dissatisfied; put three numbers in 2, 3, 4 boxes between 0 –100 which describe your feelings of being Satisfied, Fair, and Dissatisfied.

	1	2	3	4	5
Description	Very Dissatisfied	Dissatisfied	Fair	Satisfied	Very Satisfied
Range	(0, 0 ,____)	(____,____,____)	(____,____,____)	(____,____,____)	(____,100,100)

Q23. Please evaluate destination safety of Thailand according to the following factors. Please check "√" under the bold.

Destination	Objective	Action	Evaluation				
Thailand	**Transportation safety** *considering:* safety of transportation; safety of driving; convenience of telecommunication facilities	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Law & Order safety *considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Hygiene safety *considering:* possibility of contracting infectious diseases; hygiene of catering conditions	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Accommodation safety *considering*: hotel fire control system; hotel security system	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Weather safety *considering*: the difference of weather change; the possibility of natural disasters	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Sightseeing location safety *considering:* the safety to recreational facilities; the quality of the management staff	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Medical support safety *considering*: the degree of assistance available in case of accident; the completeness of medical service system	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied

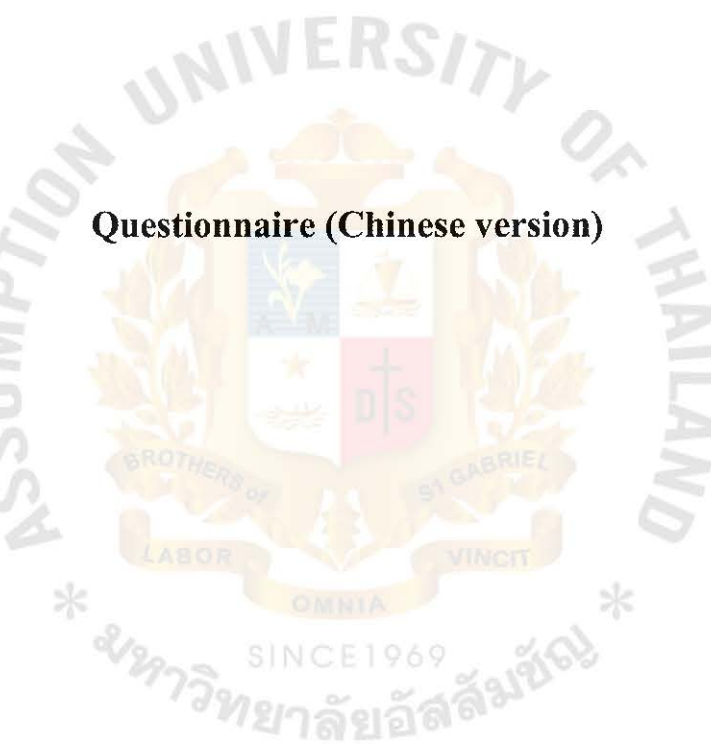
Q24. Please evaluate destination safety of Malaysia according to the following factors. Please check "√" under the bold.

Destination	Objective	Action	Evaluation				
Malaysia	**Transportation safety** *considering:* safety of transportation; safety of driving; convenience of telecommunication facilities	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Law & Order safety *considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Hygiene safety *considering:* possibility of contracting infectious diseases; hygiene of catering conditions	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Accommodation safety *considering*: hotel fire control system; hotel security system	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Weather safety *considering*: the difference of weather change; the possibility of natural disasters	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Sightseeing location safety *considering:* the safety to recreational facilities; the quality of the management staff	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Medical support safety *considering*: the degree of assistance available in case of accident; the completeness of medical service system	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied

Q25. Please evaluate destination safety of Singapore according to the following factors. Please check "√" under the bold.

Destination	Objective	Action	Evaluation				
Singapore	**Transportation safety** *considering:* safety of transportation; safety of driving; convenience of telecommunication facilities	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Law & Order safety *considering*: political stability; possibility of criminal attack; attitude of inhabitants towards tourist	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Hygiene safety *considering:* possibility of contracting infectious diseases; hygiene of catering condition	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Accommodation safety *considering*: hotel fire control system; hotel security system	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Weather safety *considering*: the difference of weather change; the possibility of natural disasters	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Sightseeing location safety *considering:* the safety to recreational facilities; the quality of the management staff	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied
	Medical support safety *considering*: the degree of assistance available in case of accident; the completeness of medical service system	I feel	Very Satisfied	Satisfied	Fair	Dissatisfied	Very Dissatisfied

APPENDIX C



Questionnaire (Chinese version)

问卷表

亲爱的先生/女士：

本人是泰国易三仓大学旅游管理在读硕士生，现正在进行题为“中国大陆游客对新加坡, 马来西亚, 泰国旅游风险评价”的毕业论文的调查工作。该调查仅以学术研究为目的。烦请您填写本问卷，十分感谢您的合作和帮助！

滕玮峰

第一部分

针对旅游目的地的七项安全因素，请您对对比较它们的重要性 (在□“√”)；并就相对重要程度在 1~9 范围内打分 (在相应数字上打“√”), 数字越大表示相对重要性越大， 其中 1 为二者同等重要 (可参考附表) 。

Q1. □ 交通安全 (考虑：交通工具和交通驾驶安全，通讯的方便程度)
□卫生安全 (考虑：感染疾病的可能性，饮食卫生状况)
相对重要程度：1 2 3 4 5 6 7 8 9

Q2. □ 交通安全 (考虑：交通工具和交通驾驶安全，通讯的方便程度)
□政治法律和社会秩序安全 (考虑：政治稳定性，遭遇违法犯罪行为攻击的可能性，当地居民对旅游者的友好程度)
相对重要程度：1 2 3 4 5 6 7 8 9

Q3. □ 交通安全 (考虑：交通工具和交通驾驶安全，通讯的方便程度)
□医疗安全 (考虑：对突发事件的救助，医疗服务系统的完善性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q4. ☐ 交通安全 (考虑：交通工具和交通驾驶安全，通讯的方便程度)
☐景点安全 (考虑：景点的设施安全，工作人员的管理质量)
相对重要程度：1 2 3 4 5 6 7 8 9

Q5. ☐ 交通安全 (考虑：交通工具和交通驾驶安全，通讯的方便程度)
☐天气安全 (考虑：当地的天气变化，自然灾害发生的可能性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q6. ☐ 交通安全 (考虑：交通工具和交通驾驶安全，通讯的方便程度)
☐ 住宿安全 (考虑：旅馆的消防设施和保安系统)
相对重要程度：1 2 3 4 5 6 7 8 9

Q7. ☐ 政治法律和社会秩序安全 (考虑：政治稳定性，遭遇违法犯罪行为攻击的可能性，当地居民对旅游者的友好程度)
☐ 卫生安全 (考虑：感染疾病的可能性，饮食卫生状况)
相对重要程度：1 2 3 4 5 6 7 8 9

Q8. ☐ 政治法律和社会秩序安全 (考虑：政治稳定性，遭遇违法犯罪行为攻击的可能性，当地居民对旅游者的友好程度)
☐医疗安全 (考虑：对突发事件的救助，医疗服务系统的完善性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q9. ☐ 政治法律和社会秩序安全 (考虑：政治稳定性，遭遇违法犯罪行为攻击的可能性，当地居民对旅游者的友好程度)
☐景点安全 (考虑：景点的设施安全，工作人员的管理质量)
相对重要程度：1 2 3 4 5 6 7 8 9

Q10. ☐ 政治法律和社会秩序安全 (考虑：政治稳定性，遭遇违法犯罪行为攻击的可能性，当地居民对旅游者的友好程度)
☐天气安全 (考虑：当地的天气变化，自然灾害发生的可能性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q11. ☐ 政治法律和社会秩序安全 (考虑：政治稳定性，遭遇违法犯罪行为攻击的可能性，当地居民对旅游者的友好程度)
☐住宿安全 (考虑：旅馆的消防 设施和保安系统)
相对重要程度：1 2 3 4 5 6 7 8 9

Q12. ☐ 卫生安全 (考虑：感染疾病的可能性，饮食卫生状况)
☐ 住宿安全 (考虑：旅馆的消防设施和保安系统)
相对重要程度：1 2 3 4 5 6 7 8 9

Q13. ☐ 卫生安全 (考虑：感染疾病的可能性，饮食卫生状况)
☐ 天气安全 (考虑：当地的天气变化，自然灾害发生的可能性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q14. ☐ 卫生安全 (考虑：感染疾病的可能性，饮食卫生状况)
☐ 景点安全 (考虑：景点的设施安全，工作人员的管理质量)
相对重要程度：1 2 3 4 5 6 7 8 9

Q15. ☐ 卫生安全 (考虑：感染疾病的可能性，饮食卫生状况)
☐ 医疗安全 (考虑：对突发事件的救助，医疗服务系统的完善性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q16. ☐ 住宿安全 (考虑：旅馆的消防设施和保安系统)
☐ 天气安全 (考虑：当地的天气变化，自然灾害发生的可能性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q17. ☐ 住宿安全 (考虑：旅馆的消防设施和保安系统)
☐ 景点安全 (考虑：景点的设施安全，工作人员的管理质量)
相对重要程度：1 2 3 4 5 6 7 8 9

Q18. ☐ 住宿安全 (考虑：旅馆的消防设施和保安系统)
☐ 医疗安全 (考虑：对突发事件的救助，医疗服务系统的完善性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q19. ☐ 天气安全 (考虑：当地的天气变化，自然灾害发生的可能性)
☐ 景点安全 (考虑：景点的设施安全，工作人员的管理质量)
相对重要程度：1 2 3 4 5 6 7 8 9

Q20. ☐ 天气安全 (考虑：当地的天气变化，自然灾害发生的可能性)
☐ 医疗安全 (考虑：对突发事件的救助，医疗服务系统的完善性)
相对重要程度：1 2 3 4 5 6 7 8 9

Q21. ☐ 景点安全 (考虑：景点的设施安全，工作人员的管理质量)
☐ 医疗安全 (考虑：对突发事件的救助，医疗服务系统的完善性)
相对重要程度：1 2 3 4 5 6 7 8 9

附表

相对重要性比较的评价标准

相对重要性数值	含意	说明
1	同等重要	A与B同等重要
3	略微重要	A比B略微重要
5	较为重要	A比B较为重要
7	非常重要	A较B非常重要
9	极其重要	A较B极其重要
2，4，6，8	分别介于1，3，5，7，9之间的中间评判值	

第二部分

Q22. 对安全性进行评价时，通常我们会说“非常不满意”，“不满意”，“一般”，“满意”，“非常满意”。

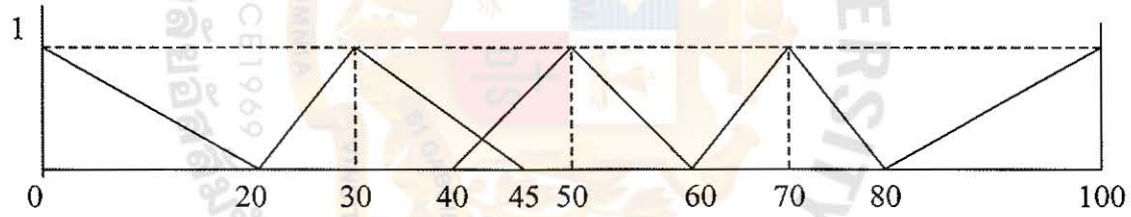
在此，请您对以上五种评价语言，在**0-100**区域内进行数字表达，描述它们的相应衡量范围。

原理说明：如果描述一个男人的身高，每个人会有不同的衡量标准。张三认为中等个的身高应在1.67m至1.75m范围 内，其中，1.70m是标准的中等个。所以张三对“中等个”的数字描述应是(1.67, 1.70, 1.75)，即(最低值，标准值，最高值)。

问卷填写说明：*譬如*，以下是某人对这五种语言的描述

非常不满意	*不满意*	*一般*	*满意*	*非常满意*
(0，0，20)	*(20，30，45)*	*(40，50，60)*	*(60，70，80)*	*(80，100，100)*

图示



请在“非常满意”和“非常不满意”下方括号内各填上1个数，以表达你对“非常满意”和“非常不满意”的衡量；在“满意”，“一般”，“不满意”下方括号内各填上3个数，以表达你对“不满意”，“一般”，“满意”的衡量。

评价语言	非常不满意	不满意	一般	满意	非常满意
数字描述	(0, 0, ____)	(____, ____, ____)	(____, ____, ____)	(____, ____, ____)	(____, 100, 100)

Q23. 请针对下表所列的评价项目，评价泰国的旅游安全状况。请在相应的格子内打"√"。

旅游国家	评价项目		安全性评价				
泰国	**交通安全** 考虑：交通工具和交通驾驶安全； 通讯的 方便程度	*我认为*	非常满意	满意	一般	不满意	非常不满意
	政治法律和社会秩序安全 考虑：政治稳定性； 遭遇违法犯罪行为攻击的可能性； 当地居民对旅游者的友好程度	*我认为*	非常满意	满意	一般	不满意	非常不满意
	卫生安全 考虑：感染疾病的可能性； 饮食卫生状况	*我认为*	非常满意	满意	一般	不满意	非常不满意
	住宿安全 考虑：旅馆的消防设施和保安系统	*我认为*	非常满意	满意	一般	不满意	非常不满意
	天气安全 考虑：当地的天气变化； 自然灾害发生的可能性	*我认为*	非常满意	满意	一般	不满意	非常不满意
	景点安全 考虑：景点的设施安全； 工作人员的管理质量	*我认为*	非常满意	满意	一般	不满意	非常不满意
	医疗安全 考虑：对突发事件的救助； 医疗服务系统的完善性	*我认为*	非常满意	满意	一般	不满意	非常不满意

Q24. 请针对下表所列的评价项目，评价马来西亚的旅游安全状况。请在相应的格子内打"√"。

旅游国家	评价项目		安全性评价				
马来西亚	**交通安全** 考虑：交通工具和交通驾驶安全； 通讯的 方便程度	*我认为*	非常满意	满意	一般	不满意	非常不满意
	政治法律和社会秩序安全 考虑：政治稳定性； 遭遇违法犯罪行为攻击的可能性； 当地居民对旅游者的友好程度	*我认为*	非常满意	满意	一般	不满意	非常不满意
	卫生安全 考虑：感染疾病的可能性； 饮食卫生状况	*我认为*	非常满意	满意	一般	不满意	非常不满意
	住宿安全 考虑：旅馆的消防设施和保安系统	*我认为*	非常满意	满意	一般	不满意	非常不满意
	天气安全 考虑：当地的天气变化； 自然灾害发生的可能性	*我认为*	非常满意	满意	一般	不满意	非常不满意
	景点安全 考虑：景点的设施安全； 工作人员的管理质量	*我认为*	非常满意	满意	一般	不满意	非常不满意
	医疗安全 考虑：对突发事件的救助； 医疗服务系统的完善性	*我认为*	非常满意	满意	一般	不满意	非常不满意

Q25. 请针对下表所列的评价项目，评价新加坡的旅游安全状况。请在相应的格子内打"√"。

旅游国家	评价项目		安全性评价				
新加坡	**交通安全** 考虑：交通工具和交通驾驶安全； 通讯的 方便程度	*我认为*	非常满意	满意	一般	不满意	非常不满意
	政治法律和社会秩序安全 考虑：政治稳定性； 遭遇违法犯罪行为攻击的可能性； 当地居民对旅游者的友好程度	*我认为*	非常满意	满意	一般	不满意	非常不满意
	卫生安全 考虑：感染疾病的可能性； 饮食卫生状况	*我认为*	非常满意	满意	一般	不满意	非常不满意
	住宿安全 考虑：旅馆的消防设施和保安系统	*我认为*	非常满意	满意	一般	不满意	非常不满意
	天气安全 考虑：当地的天气变化； 自然灾害发生的可能性	*我认为*	非常满意	满意	一般	不满意	非常不满意
	景点安全 考虑：景点的设施安全； 工作人员的管理质量	*我认为*	非常满意	满意	一般	不满意	非常不满意
	医疗安全 考虑：对突发事件的救助； 医疗服务系统的完善性	*我认为*	非常满意	满意	一般	不满意	非常不满意

APPENDIX D

Tourist risk weights of respondents

Tourist risk weights of respondents

Respon-dent	CR	Transpor-tation	Law & Order	Hygiene	Accommo-dation	Weather	Sightseeing	Medical support
1	0.10	0.057	0.413	0.064	0.049	0.064	0.305	0.048
2	0.09	0.092	0.334	0.164	0.079	0.049	0.200	0.082
3	0.09	0.083	0.451	0.080	0.081	0.115	0.069	0.122
4	0.08	0.101	0.124	0.278	0.116	0.070	0.056	0.255
5	0.08	0.115	0.434	0.193	0.074	0.022	0.105	0.058
6	0.03	0.057	0.333	0.152	0.082	0.112	0.101	0.163
7	0.07	0.049	0.253	0.127	0.213	0.108	0.152	0.097
8	0.10	0.062	0.467	0.185	0.115	0.054	0.049	0.067
9	0.08	0.055	0.322	0.196	0.052	0.112	0.077	0.185
10	0.10	0.072	0.351	0.164	0.088	0.064	0.089	0.171
11	0.09	0.201	0.174	0.145	0.044	0.085	0.216	0.135
12	0.10	0.040	0.106	0.214	0.133	0.238	0.173	0.097
13	0.09	0.088	0.412	0.131	0.153	0.031	0.085	0.100
14	0.07	0.184	0.343	0.140	0.138	0.038	0.055	0.103
15	0.08	0.070	0.397	0.119	0.071	0.030	0.131	0.183
16	0.10	0.109	0.052	0.284	0.163	0.050	0.092	0.250
17	0.05	0.249	0.222	0.246	0.039	0.025	0.119	0.099
18	0.09	0.214	0.479	0.061	0.087	0.036	0.06	0.063
19	0.09	0.179	0.439	0.164	0.079	0.030	0.046	0.063
20	0.08	0.127	0.333	0.197	0.074	0.054	0.122	0.093
21	0.05	0.089	0.438	0.077	0.048	0.121	0.101	0.125
22	0.09	0.049	0.272	0.323	0.155	0.025	0.137	0.038
23	0.06	0.083	0.306	0.338	0.068	0.027	0.034	0.145
24	0.09	0.219	0.333	0.041	0.051	0.080	0.243	0.033
25	0.10	0.075	0.130	0.170	0.182	0.063	0.154	0.226
26	0.10	0.087	0.159	0.040	0.138	0.294	0.091	0.191
27	0.09	0.103	0.463	0.036	0.181	0.044	0.139	0.034
28	0.05	0.081	0.248	0.156	0.097	0.269	0.035	0.114
29	0.08	0.170	0.199	0.190	0.221	0.033	0.110	0.078
30	0.09	0.128	0.535	0.061	0.114	0.026	0.024	0.112
31	0.06	0.070	0.176	0.136	0.284	0.036	0.098	0.200
32	0.10	0.027	0.330	0.226	0.192	0.109	0.046	0.071
Average		**0.106**	**0.313**	**0.159**	**0.114**	**0.079**	**0.110**	**0.119**

Annotation: Besides these 32 respondents' data, other 8 respondents' data were rejected because of their large inconsistency ratios (CR). These large CR values are 0.13, 0.43, 0.29, 0.18, 0.32, 0.25, 0.72, 0.15, respectively.

APPENDIX E

The subjective cognition results of respondents towards five levels of linguistic variables

The subjective cognition results of respondents towards five levels of linguistic variables

Note: each set of the following numbers represent triangular fuzzy numbers (the lowest ,the moderate ,the highest)

Respon-dent	Very Dissatisfied			Dissatisfied			Fair			Satisfied			Very Satisfied		
1	0	0	20	21	23	45	40	50	60	60	70	80	81	100	100
2	0	0	20	20	30	40	40	50	60	60	70	80	80	100	100
3	0	0	20	21	30	40	41	50	60	60	70	80	81	100	100
4	0	0	30	31	45	60	61	65	70	71	75	80	81	100	100
5	0	0	25	30	43	60	61	65	70	71	75	80	81	100	100
6	0	0	20	21	30	39	40	50	60	61	70	80	81	100	100
7	0	0	10	11	25	39	40	50	60	61	71	80	81	100	100
8	0	0	30	31	35	39	40	50	60	61	75	80	81	100	100
9	0	0	20	21	30	40	40	50	60	60	70	85	85	100	100
10	0	0	30	30	35	40	40	50	60	60	75	85	85	100	100
11	0	0	20	20	30	45	40	50	60	60	70	80	80	100	100
12	0	0	20	21	30	39	40	50	69	70	80	90	91	100	100
13	0	0	20	21	30	40	40	50	60	71	80	90	91	100	100
14	0	0	10	10	20	30	30	50	70	70	80	90	91	100	100
15	0	0	25	25	37	50	51	60	70	71	80	85	86	100	100
16	0	0	20	21	30	40	41	50	60	61	70	80	81	100	100
17	0	0	10	11	25	40	40	50	60	60	70	80	80	100	100
18	0	0	10	10	20	30	30	50	70	70	80	90	95	100	100
19	0	0	10	10	20	30	30	45	60	60	70	80	80	100	100
20	0	0	10	10	20	30	30	50	70	70	80	90	90	100	100
21	0	0	30	25	42	59	60	68	74	75	80	89	90	100	100
22	0	0	20	21	32	45	40	50	60	60	70	80	81	100	100
23	0	0	20	21	30	40	41	50	60	61	70	80	81	100	100
24	0	0	20	21	30	40	41	50	60	61	70	80	81	100	100
25	0	0	15	15	30	45	45	55	65	65	75	85	85	100	100
26	0	0	20	21	30	39	40	50	60	61	70	80	81	100	100
27	0	0	20	21	30	40	41	50	60	61	70	80	81	100	100
28	0	0	20	21	40	59	60	70	80	81	85	89	90	100	100
29	0	0	20	21	30	40	41	50	60	61	70	80	81	100	100
30	0	0	35	36	48	59	60	68	70	75	80	85	90	100	100
31	0	0	29	30	45	59	60	68	75	75	80	90	91	100	100
32	0	0	10	10	20	30	30	50	70	70	80	90	90	100	100
Average	**0**	**0**	**20**	**21**	**31**	**43**	**43**	**54**	**64**	**65**	**74**	**84**	**85**	**100**	**100**

Annotation: the data of the respondents 1-28 were collected in Hangzhou; the data of the respondents 29-32 were collected in Bangkok.

APPENDIX F

Map of Southeast Asia

Map of Southeast Asia