

# Impact Satisfaction Factors of Ecotourism for Sustainable Tourism Business and Management

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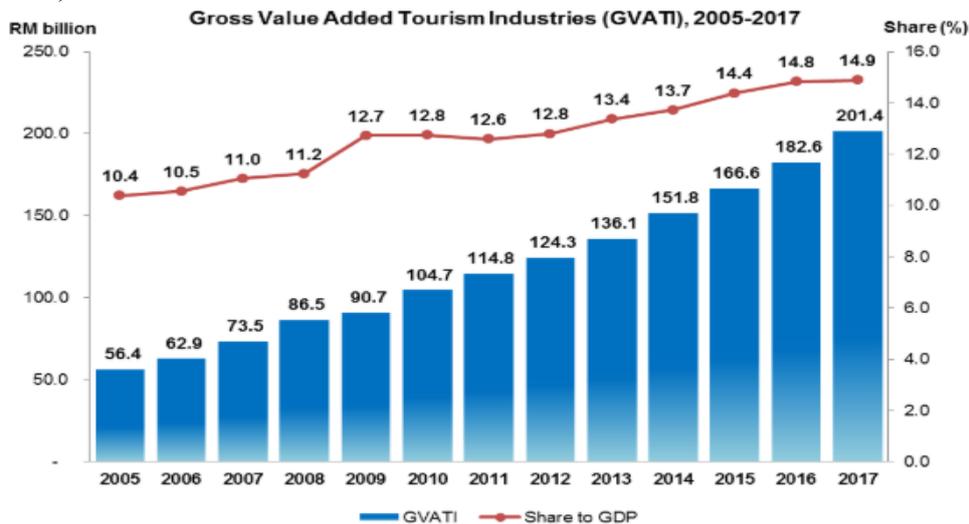
In almost all real-world problems, consideration of multiple-criteria decisions requires the decision maker to make constructive decisions to obtain the desirable outcomes. A multiple-criteria decision making tool is the Analytic Hierarchy Process (AHP) which is frequently used in most applications involving decision making. Since Sabah is well known for its natural and rich resources, ecotourism has a significant potential to enhance the tourism industry. This paper aims to determine the satisfaction factors of tourists visiting Sabah and specifically in the ecotourism industry. The four-step modelling procedure for a decision model using AHP is introduced. It includes the pairwise comparison table, building of the normalised matrix, weightage determination, and finally, the consistency ratio of the overall main criteria. The ranking of the main and sub-criteria are then made so that the best main and sub-criteria related to tourist satisfaction are identified. The results showed that the top criteria preferred by tourists for eco-tourism is safety, followed by benefits, activities, services and finally destination. The most strongly preferred sub-criteria for destination is 'interest', for benefit is 'relaxing and fulfilling', for activities is 'experiencing nature and beautiful scenery', for safety is 'concerned personal Safety and security', and for service is 'on time service to tourists'. All preferred factors have met the values of inconsistency of less than 0.1 (<0.1). Findings of these impact factors towards ecotourism may enhance further adventurous and physical challenges at Sabah ecotourism hotspots by introducing, increasing and developing more adventurous activities, inclusive of notified safety and security, which needs sustainable tourism management. In conclusion, tourists are said to be very satisfied with the ecotourism industry in Sabah as indicted in their great positive responses, hence creating more tourism businesses.

**Key words:** *Ecotourism, impact factors, analytic hierarchy process, criteria ranking, decision model.*

## Introduction

Tourism industries have been the focus of governments all over the world as it can generate revenues and job opportunities. It can be developed by addressing and considering the participation groups and their scopes (Charles & Brent Ritchie, 2009). The four different groups that participate in tourism are the tourists themselves, the businesses providing tourist goods and services, the government of the host community or area, and the host community itself. Tourism has been the world's largest industry that significantly contributes to the world's total gross national product (GNP). Arrivals of international tourists may reach 1.8 billion by the year 2030 according to the United Nations World Tourism Organization (UNWTO, 2016). The tourism industry in Malaysia has continued its significant contribution to the economy with a share of 14.9 % in 2017, as compared to 10.4% in 2005. The value added by the tourism industry in Malaysia has been in an upward trend since 2005, and is growing rapidly with an average annual growth rate of 11.2% over the past twelve years, and still trending upwards, as shown in Figure 1.

**Figure 1.** Trend on Tourism Related Industries from 2005-2017 (Tourism Satellite Account, 2017)



Furthermore, Malaysia is an attractive tourist destinations, bursting with its beautiful natural resources and bustling cities. Malaysia also has been acknowledged as one of the best ecotourism spots due to elements like primeval forests and natural attractions, clear blue waters, unique geographical landscape, and diverse culture and heritage. According to

Sudipta (2017), Malaysia is one of the 12 mega-biologically diverse countries in the world, and has large numbers of exotic flora and fauna. Ecotourism has become one of Malaysia's growing industries, and an important investment for the growth of the economy. Besides ecotourism, Sabah and Sarawak have largely contributed to Malaysia's diverse tourism with regard to ethnic or cultural tourism, and natural resources as tourist attractions (Garbutt & Orudente, 2006). Chan and Baum (2007) stated the various needs of potential tourists for ecotourism to flourish, where more attention is needed on ecotourism sites and activities, service staff, and the quality information on natural eco-parks. It is thus essential to study and understand ecotourism perception and satisfaction of tourists. Hence, this paper aims to study the impact factors on ecotourism in Sabah which in turn leads to its sustainability and management.

## Literature Review

Nature or ecological tourism, hence its name 'Ecotourism' involves experiencing natural and ecological places, typically through outdoor activities that are sustainable with regard to their environmental impact. It is also a temporary movement of tourists that usually focuses on protected and pure surrounding environments. Weaver & Lawton (2007) supported this definition where they defined nature tourism as "the feeling and communication with pristine nature environments that involves inactive to active activities in the well protected natural settings". Examples of activities involved are wildlife watching, physical challenges, risky or tough activities, and engaging with nature. Eco-tourism upholds the beliefs and principles concerning preservation of the environment and the learning and benefit of the socioeconomics of the local people (He *et al.*, 2008).

Coghlan (2012) studied the Australian Great Barrier Reef and stated that it is possible to conserve natural resources, and at the same time, create tourist satisfaction through providing experiences of the natural environment and provision of high quality services. Since ecotourism involves activities that reduce environmental degradation and supports environmental conservation, besides respect for nature and local communities, the components of education and awareness, and tourism sustainability have to be the major principles in the process of economic development. To implement these principles, perception of ecotourism should be developed first. A study regarding the determinant strategies for ecotourism in Turkey identified that one of the most important strategies is to organise and develop ecotourism perception (Akbulak and Cengiz, 2014).

Alexandr Vetitnev *et al.* (2013) did a case study on Russian Resorts which showed that if tourists were satisfied with their travel experience, they were more willing to revisit a destination again. This study was tested empirically using a model to examine the relationship between satisfaction, affecting factors and destination loyalty. Findings indicated

that some factors, such as purpose of travel, travel payments, choice of accommodation, holiday organisation mode, and tourists' level of satisfaction had significant effects on tourists' intention to revisit.

Farzad Tahriri *et al.* (2008) used the AHP approach on the evaluation and selection of suppliers in a steel manufacturing company. Factors taken into consideration were quality, delivery, cost direct feedback, discipline, finance, management and organisation, technical capabilities, facilities, performance, security, and environmental performances. They found that 'trust and cost' were the major factors, and the suggested model can be used to help and solve the problem of selecting the supplier's optimal combination of supplies.

Carlos *et al.* (2017) applied the AHP decision-making in energy planning where different types of factors were involved. Several aspects were considered due to the increasing complexity of the social, technological, and economic factors. They used AHP to prioritise a set of criteria, sub criteria and alternatives as a support for the decision-making process of energy planning with renewable energies for rural areas in the Caribbean region of Colombia. Based on the participation of experts, 5 criteria, 20 sub criteria, and 4 alternatives were defined. Using AHP, the same group of experts was consulted in order to prioritise all aspects. The results showed that the most relevant criteria were technical with 24.7%, followed by environmental (21.7%), social (19.6%), economic (17.8%) and lastly, risk (16.3%). The best renewable energy alternative was found to be solar with 45.3%.

### **Problem Statement**

The tourism industry had evolved and modernised considerably over the years, but simultaneously has also become highly competitive. With the rapid growth and increasing competition in the global tourism industry, tourism businesses are exploring ways to enhance their competitive advantages. Since domestic tourism had shown an increasing trend of participation among Malaysians, it is only logical that developments on basic infrastructure for ecotourism should be improved. However, even though it is apparent that there seems to be an upward trend on the domestic tourism in Malaysia, attempts to identify the domestic ecotourism markets are very limited. Despite the fact that there are several studies which have segmented the ecotourists in nature-based parks in Malaysia, as conducted by Hassan *et al.* (2009) and Musa *et al.* (2010), only a few studies included segments comprising of a mixture of domestic and international tourists as their main thesis. Although quality tourism has been a key for rapid economic growth, the ongoing number of dissatisfied tourists suggested that improvement in ecotourism needs further attention. This leads to the importance of understanding the current quality of problems. Sustainability of the ecotourism industry is greatly dependable on feedback obtained from domestic and international tourists. Hence, a modelling approach is applied via the Analytic Hierarchy Process (AHP).

## Methodology

This study was conducted at five identified ecotourism spots in Kota Kinabalu, Sabah. The number of arrivals tourists arrivals at these places were a key focus.

### *Data Collection*

Pilot test is a data collection instrument with a small number of respondents before a full-scale survey of a population. The fundamental idea of this test is to reduce the maximum measurement error and to avoid repetition of efforts in assessing the feasibility of data (Thabane *et al.*, 2010). The pilot test of this study was carried out with the randomly distribution of questionnaires among a small sample size of 30 respondents before a large sample size of 150 respondents was conducted. The main computer softwares used for analysis were the IBM Statistical Package for Social Science (SPSS) version 24.0, and Microsoft Excel. Procedures of data entering, editing, and cleaning were initially carried out. Data were then summarised using data frequencies, descriptive statistics, graphs or charts, and data analysis via tests such as pairwise comparison, among others. All analysed data was then stored in Microsoft Excel for further synthetisation, consistency calculation, and overall priority ranking for the Analytic Hierarchy Process (AHP).

### *Validity and Reliability*

The questionnaire had two sections; Section A was mainly about the respondents' demographic profiles, while Section B was about the tourist's satisfaction on Ecotourism in Sabah, according to the related situation and requirements. Respondent validity was conducted on the values obtained through these studies (Wells & Wollack, 2003). This was determined through construct validity, where a similar concept questionnaire was given to the same respondents, and the results checked were related before proceeding with data analysis (Bolarinwa, 2015). According to Ajay (2017), researchers may have given a questionnaire on a similar concept to determine if the results were connected or the researcher may have given a questionnaire on various concepts, to determine if the results were the alternative. This referred to the questionnaires ability to measure the concept adequately. Once the questionnaires were measuring something conceptually or theoretically, further works were necessary to determine its construct validity.

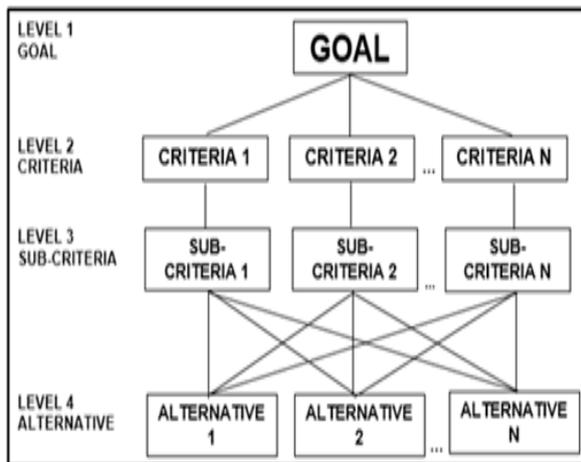
Cronbach's Alpha is the most popular index which provides a measure of the extent to which the items on a test could be thought of as a mini-test to provide consistent data with regard to students' mastery of the field (Wells & Wollack, 2003). The alpha Cronbach value was determined by using the following formula:-  $\hat{\alpha} = \frac{k}{k-1} \left( 1 - \frac{\sum_{i=1}^k p_i (1-p_i)}{\hat{\alpha}_x^2} \right) \dots(1)$  where, k =

number of variables,  $p_i$  = proportions of the respondents who answered variable  $i$  correctly, and  $\hat{\alpha}_x^2$  = sample variance of total population. The closer the value of  $\alpha$  to 1.00, the higher the consistency, and higher efficiency of the instrument used. This study used an alpha value of 0.60 as the minimum acceptable reliability test (Nunnally & Bernstein, 1994).

### AHP Multiple-Criteria Decision-Making Model

AHP hierarchical structure in Figure 2 allows decision-makers to draw up criteria, sub-criteria, and alternatives using a special matrix for a better assessment (Wang *et al.*, 2004). The AHP techniques involve setting a higher priority through a four-step modelling procedure, and a scale of 1 to 9 as in Table 1 (Saaty, 2005). Thus, the individual preferences would ultimately give profound effect on the results obtained when objective estimates of relative importance were drawn into a set of degrees or total weights (Saaty, 2005).

**Figure 2.** Analytic Hierarchy Process (AHP) Model



**Table 1:** Rating Scores based on Satisfaction Level

Rating	Level of Satisfaction
1	Extremey low
2	Very low
3	Low
4	Slightly low
5	Average
6	Slightly high
7	High
8	Very high
9	Extremely high

To assess every alternative against each requirement, all alternatives are going to be given ratings according to its satisfaction level at each tourist spot based on each criterion. If the alternatives have absolutely satisfied the requirement, it will receive a high score. However, if the alternatives do not satisfy the requirements, it will receive a lower score, as shown in Table 1. The scale of importance of the activities had been defined by Saaty (2005).

The flowchart on the AHP method used can be referred to Hambali *et al.* (2008). The fundamental to the AHP method is the use of paired comparisons' ratio scale priorities. Matrix (size:  $n \times n$ ) for pairwise comparison is built for each level in the hierarchy where number, arrangement, and size of matrix would depend on the number of elements. Letting  $a_{ij}$  defines the elements  $(i,j)$  of matrix, where the criterion in row  $i$  for  $i=1,2,\dots,n$ , and in column  $j$  for  $j=1,2,\dots,n$ . For all  $i,j = 1,2,3,\dots, n$ , and  $a_{ij} > 0$  (Chandran *et al.*, 2005). The pairwise

comparison matrix should be normalised, to produce a normalised matrix calculation of the sum of each column of the matrix divided by the number of pairwise comparisons element,  $n$ . According to Hambali *et al.* (2008), the average of the normalised method is used to calculate the priority vector. This method divides the elements in each column with the number of columns, and then adds the elements in each row and dividing the resulting sum by the number of elements in the line ( $n$ ). This process is a method for normalising the average column.

Next, the Inconsistency (I) is calculated by comparing the data with a set of random decisions which are assumed to have the same matrix size and certainty is random. Random index (RI) is the average number of the CI matrix generated randomly. The ratio of the probability calculations for consistency is generated by a pairwise comparison matrix which was filled by random. If the Consistency Ratio (CR) value is  $\leq 0.1$ , a matrix of pairwise comparison is not consistent enough. A value between 0 and 0.10 or in the range of 10% to an output of random justification is acceptable.

## **Results and Discussion**

### ***Respondents Socio-Demographic Profiles***

Descriptive statistics of 150 respondents are depicted in Table 2. The respondents comprised of domestic (48%) and international tourists (52%), aged between less than 18 years (<18) up to more than 60 years of age (>60). Most of the respondents aged between 18-30 years (48%) with male (63.3%), and female (36.7%); married (35.3%), and single (63.3%) respectively. Most of the respondents achieved a degree level of education at 43.3%, with full time jobs at 32%, and saving monthly earnings of less than MYR1000 at 34%. 37.3% of the respondents chose 'holiday' as their purpose of travelling with a monthly frequency of 1-2 times (50.7%), and 'ecotourism' received equal preference by tourists. Among the 150 respondents, 22% preferred to revisit Sabah again, while 22.7% would recommend these ecotourism spots to others. Table 2 showed the high frequencies with their percentages of the demographics profiles (in yellow highlights).

**Table 2:** Distribution of Eco-Tourists Based on Socio-Demographic Factors

Demographic Factors	Frequency (f)	Percentage (%)	Demographic Factors	Frequency (f)	Percentage(%)
<b>Nationality</b>			<b>Travelling Purposes</b>		
Domestic	72	48	Business	15	10.0
International	78	52	Visiting	17	11.3
<b>Age</b>			Educational	27	18.0
Less than 18 years old	8	5.3	Relaxation	31	20.7
18 – 30 years	72	48.0	Holiday	56	37.3
31 – 40 years	83	24.0	Medical	4	2.7
41 – 50 years	36	11.3	<b>Frequency of Travelling (in a month)</b>		
51 – 60 years	17	7.3	1 – 2 times	76	50.7
More than 60	11	4.0	3 – 5 times	53	35.3
<b>Gender</b>			6-10 times	19	12.7
Male	55	36.7	More than 10	2	1.3
Female	95	63.3	<b>Motivation in Choosing Places for Travelling</b>		
<b>Marital Status</b>			Ecotourism	75	50.0
Married	53	35.3	Tourism	75	50.0
Single	97	64.7	<b>Frequency of Satisfaction Level of Intention to Revisit</b>		
<b>Higher Education Achieved</b>			1 (Extremely	3	2.0
High School /	19	12.7	2 (Very Low)	7	4.7
Degree	65	43.3	3 (Low)	9	6.0
Masters	24	16.0	4 (Slightly	12	8.0
PHD	24	16.0	5 (Average)	27	18.0
Others	18	12.0	6( Slightly	13	8.7
<b>Employment Status</b>			7 (High)	25	16.7
Full time	48	32.0	8 (Very High)	21	14.0
Part-time	15	10.0	9 (Extremely	33	22.0
Unemployed	12	8.0	<b>Frequency of Satisfaction Level of Intention to Recommend</b>		
Self-	33	22.0	1 (Extremely	2	1.3
Retired	4	2.7	2 (Very Low)	8	5.3

Students	38	25.3	3 (Low)	7	4.7
<b>Monthly Income Savings</b>			4 (Slightly)	15	10.0
Less than	51	34.0	5 (Average)	22	14.7
1000 – 2000	37	24.7	6 (Slightly)	16	10.7
2000 – 3000	33	22.0	7 (High)	18	12.0
More than	29	19.3	8 (Very High)	28	18.7
			9 (Extremely High)	34	22.7

### *Reliability Tests*

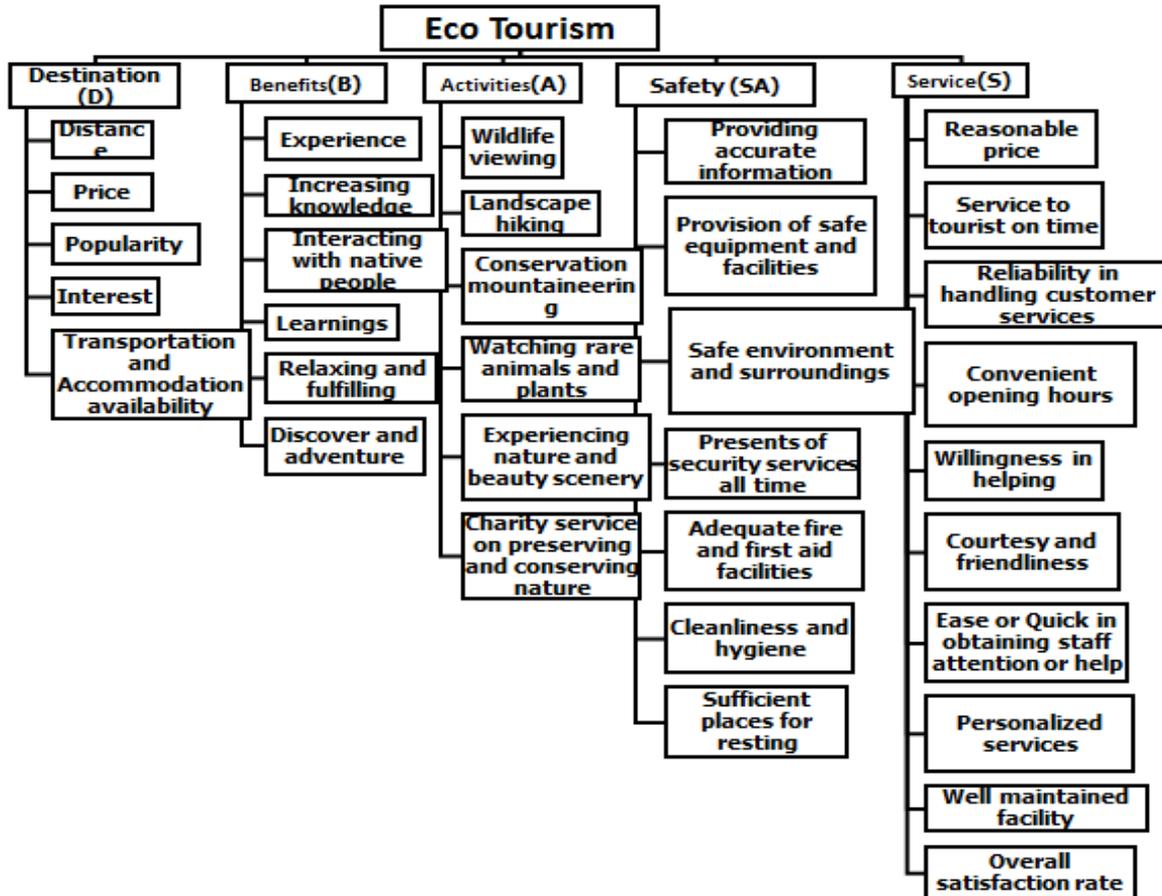
In this study, a pilot test involving 30 tourists were randomly selected for the initial distribution of the questionnaires. Table 3 shows that the pilot study had an alpha Cronbach value of 0.956. The questionnaire was said to be reliable since the value was in the range of between 0.6 and 1.0. Thus, it can be further used for distribution. As shown in Table 3, the total data of 150 respondents had an alpha cronbach value of 0.985.

**Table 3:** Cronbach alpha values of Reliability Tests

	Cronbach's Alpha	No. of items	No. of respondents
Pilot study	0.956	74	30
Total survey	0.985	74	150

Figure 3 depicts the hierarchical structure in decision-making based on multiple criteria and sub criteria used in the Sabah ecotourism industry. After the descriptive and reliability tests, the weights of criteria were then specified for the ecotourism industry.

**Figure 3:** Hierarchy Structure of AHP Multiple-Criteria Decision-Making model on Eco-Tourism.



After the descriptive and reliability tests, the weights of criteria were then specified for ecotourism. The pairwise comparison between the criteria depending on the values of the arithmetic mean is shown in Table 4.

**Table 4:** Pairwise comparison Matrix of Main Criteria

	Destination	Benefits	Activities	Safety	Services
Destination	1	0.2	0.14	0.17	0.11
Benefits	5	1	0.33	0.2	0.125
Activities	7	3	1	0.2	0.125
Safety	6	5	2	1	0.33
Services	9	8	8	3	1
SUM	28	17.2	11.47	4.57	1.69

Using pairwise matrix in Table 4, the normalised matrix of main criteria was calculated as shown in Table 5 with ‘services’ having the highest weight of 0.546438 (or 54.64%) and

scored 0.088 as the consistency ratio (CR) (less than 0.1). This indicated that the tourists considered ‘services’ as the most important main criteria.

**Table 5:** Normalized matrix of Main Criteria

	Destinati on	Benefit s	Activiti es	Safety	Services	Weight	Consistency Measure
Destinati on	0.035714	0.0116 28	0.01220 6	0.0371 99	0.06508 9	0.03236 7	502.37%
Benefits	0.178571	0.0581 4	0.02877 1	0.0437 64	0.07396 4	0.07664 2	511.54%
Activities	0.25	0.1744 19	0.08718 4	0.0437 64	0.07396 4	0.12586 6	551.70%
Safety	0.214286	0.2906 98	0.17436 8	0.2188 18	0.19526 6	0.21868 7	561.60%
Services	0.321429	0.4651 16	0.69747 2	0.6564 55	0.59171 6	<b>0.54643 8</b>	569.85%
<b>Consistency Index=</b>							0.098531
<b>Random Index=</b>							1.12
<b>Consistency Ratio =</b>							<b>0.087974</b>
<b>Lambda Max=</b>							5.394124

Table 6 shows the final results using the AHP procedures on the priorities (or weights) of main criteria, and sub-criteria respectively on the Eco-Tourism industry in Kota Kinabalu.

**Table 6:** Weights of Main Criteria and Sub-Criteria of AHP on Eco-Tourism

Criteria	Priorities (Weights)	
<i>Inconsistency index = 0.087974</i>		
<i>Main Criteria for EcoTourism</i>	Weight	Ranking
Destination	3.24	5
Benefits	7.66	4
Activities	12.59	3
Safety	21.87	2
Service	54.64	1
<i>Sub Criteria for Destination</i>		
<i>Inconsistency index = 0.096312</i>		

Distance	0.0992	4
Price	0.1110	3
<b>Popularity</b>	<b>0.5524</b>	<b>1</b>
Interest	0.1869	2
Transportation and Accommodation availability	0.0505	5
<i>Sub Criteria for Benefits</i>		
<i>Inconsistency index = 0.079444</i>		
Experience	0.1419	2
Increasing knowledge & learning on ecological areas	0.1341	3
Opportunity of meeting new people	0.0460	4
Learning various culture and heritage with nature	0.0460	5
<b>Relaxing and fulfilling</b>	<b>0.5860</b>	<b>1</b>
Discovering remote or unspoiled nature and adventure	0.0460	6
<i>Sub Criteria for Activities</i>		
<i>Inconsistency index = 0.094098</i>		
Ecotours and visiting nature parks	0.1068	3
Charity service on preserving and conserving nature	0.0962	4
Wildlife viewing	0.0342	6
Experiencing nature and beauty scenery	0.0579	5
Scuba diving, kayaking or water activities	0.1074	2
<b>Adventures and physical challenges</b>	<b>0.5975</b>	<b>1</b>
<i>Sub Criteria for Safety</i>		
<i>Inconsistency index = 0.097337999</i>		
Provision of accurate information	0.1285	3
<b>Provision of safety equipment and facilities</b>	<b>0.4863</b>	<b>1</b>
Presence of security services at all times	0.0747	4
Availability of adequate fire and first aid facilities	0.0281	8
Cleanliness and hygiene	0.0458	6
Sufficient places for resting	0.0476	5
Concerned personal safety and security	0.0327	7
Safe environment and surroundings	0.1564	2
<i>Sub Criteria for Service</i>		
<i>Inconsistency index = 0.092692</i>		

Reasonable price	0.0240	10
On-time service to tourist	0.1324	2
Reliability in handling customer services	0.1004	4
Convenient opening hours	0.0718	5
<b>Willingness in helping</b>	<b>0.3826</b>	<b>1</b>
Courtesy and friendliness	0.0331	9
Easy or quick in obtaining staff attention or help	0.0412	8
Personalized services	0.1111	3
Well maintained facility	0.0502	7
Overall satisfaction rate	0.0534	6

From Table 6, the main criterion ‘services’ scored the highest weight at 54.64% (highlighted in yellow). This indicates that this criterion was of great importance for tourists who visited these ecotourism spots. Second criterion is ‘safety’ which obtained a weight of 21.87%. It deserved this rank of importance because of its significant impact felt by tourists who needed safety they were visiting these spots. Next was ‘activities’ which earned a moderate weight of 12.59% , followed by the criterion of ‘benefits’ which earned a medium weight of 7.66%, and lastly, the criterion of ‘destination’ a lower proportion of importance of 3.24%. The sequence of highly to lesser importance of main criteria is shown as follows: Services=>Safety=>Activities=>Benefits=>Destination.

The pairwise comparison of main criteria in Table 6 showed that the inconsistency index equals to 0.087974 (highlighted in blue), which is less than the requirement value (0.1). Hence, it is satisfactory according to the AHP conditions and requirements. Similarly, with the sub-criteria in identifying the priorities, the inconsistency index for all comparisons are less than 0.1. This indicates the judgment received from tourists in the ranking of the main and sub criteria.

The sub-criteria for each criterion had also been ranked according to their weightage. Sub-criteria for destination was ranked as; popularity (55.24%), interest (18.69%), price (11.10%), distance (9.92%), and transportation and accommodation (5.05%).

The sub-criteria for benefits was ranked as; relaxing and fulfilling (58.60%), experience (14.19%), increasing knowledge on ecological areas (13.41%), learning various culture and heritage with nature (4.6%), interacting with native people and the nature (4.6%), and discovering remote or unspoiled nature and adventure (4.6%).

Sub-criteria for activities were ranked as; adventures and physical challenges (59.75%), scuba diving, kayaking or water activities (10.74%), ecotours and visiting nature parks

(10.68%), charity service on preserving and conserving nature (9.62%), experiencing nature and beauty scenery (5.79%), and wildlife viewing (3.42%).

Sub-criteria's ranking for Safety were ranked as ; provision of safety equipment and facilities (48.63%), safe environment and surroundings (15.64%), provision of accurate information (12.85%), presence of security services at all times (7.47%), sufficient places for resting (4.76%), cleanliness and hygiene (4.58%), concerned personal safety and security (3.27%), and availability of adequate fire and first aid facilities (2.81%).

Lastly, ranking of sub-criteria's for services were; willingness in helping (38.26%), on-time service to tourist (13.24%), personalised services (11.11%), reliability in handling customer services (10.04%), convenient opening hours (7.18%), overall satisfaction rate (5.34%), well maintained facility (5.02%), easy or quick in obtaining staff attention or help (4.12%), courtesy and friendliness (3.31%), and reasonable price (2.4%). These findings are significant to the government in the decision making for the development of Sabah ecotourism and specifically in the economic region.

## **Conclusion**

Using the AHP modelling approach, the main criteria was ranked from the high to low, as the following: Services =>Safety =>Activities =>Benefits =>Destination respectively. Tourists were found to visit these ecotourism spots due to popularity, relaxing and fulfilling aura, adventures and physical challenges, provision of safety equipment and facilities, and finally, willingness in helping were the maximum scored sub-criteria on Sabah ecotourism.

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