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Evaluating Visitor's Preferences of Ecotourism and Management Attributes in Kubah National Park: A Choice Experiment Approach

Menilai Pilihan Utama bagi Atribut Ekopelancongan dan Pengurusan dalam Kalangan Pengunjung Taman Negara Kubah: Kaedah Eksperimen Pilihan

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ABSTRACT

The growing numbers of national parks worldwide have somehow attracted the interests of nations around the world as it is now one of the important income generator for the tourism industry of a particular country. Since its inauguration, the concept of national parks has developed and expanded based on the important attributes of its environmental resources, albeit it is frequently affiliated to the possibilities of conservation and preservation of the biodiversity and its environment. The central motivation for this study is to estimate visitor's preferences for improvement in ecotourism and management in Kubah National Park (KNP) by utilizing the economic valuation tools, specifically the choice experiment (CE) model. Accordingly, the focus of this study is limited to the valuation of ecotourism and management attributes of KNP, Sarawak, Malaysia. Choice experiment of the stated preference approach was utilized and five attributes of ecotourism and management attributes were identified, namely; (i) amenities (AMT), (ii) information availability (INFO), (iii) interpretive trails availability (ITA), (iv) park guide availability (PG) and (v) entrance fee charges (MPRICE). Information and statistics were gathered using questionnaires from face-to face interviews. Conditional logit (CLGT) model analyses involving a sample of 303 respondents was carried out.

Keywords: Ecotourism attribute; management attribute; choice experiment; conditional logit; Kubah National Park

ABSTRAK

Jumlah Taman Negara di seluruh dunia yang semakin meningkat telah menarik minat dan perhatian negara-negara di seluruh dunia kerana ia kini merupakan salah satu penjana pendapatan yang penting bagi industri pelancongan sesebuah negara. Konsep Taman Negara pada dasarnya ditubuhkan dan berkembang berdasarkan atribut-atribut penting sesebuah kawasan semula jadi, walaupun idea penubuhan kawasan-kawasan ini acapkali berjalan seiring dengan idea untuk pemuliharaan dan pemeliharaan alam semulajadi dan ekosistem setempat. Motif utama kajian ini adalah untuk menganggarkan nilai pilihan pelawat bagi penambahbaikan ekopelancongan dan juga pengurusan Taman Negara Kubah (TNK) dengan menggunapakai alat-alat penilaian ekonomi. Sehubungan dengan itu, fokus kajian ini adalah terhad kepada nilai ekopelancongan dan pengurusan yang terdapat di TNK, Sarawak, Malaysia. Kaedah pemodelan pilihan telah digunakan yang meliputi lima atribut-atribut ekopelancongan dan pengurusan yang telah dikenal pasti, iaitu; (i) kemudahan (AMT), (ii) penyediaan maklumat (INFO), (iii) ketersediaan jejak interpretif (ITA), (iv) pepandu taman (PG) dan (v) caj yuran masuk (MPRICE). Maklumat dan statistik diperolehi dengan menggunakan soal-selidik secara temubual secara bersemuka. Analisis menggunakan model conditional logit (CLGT) yang melibatkan sampel responden berjumlah 303 orang telah dilakukan.

Kata kunci: Atribut ekopelancongan; atribut pengurusan; kaedah eksperimen pilihan; conditional logit; Taman Negara Kubah

INTRODUCTION

One of the best measures in conserving biodiversity is through the designation of protected areas. A protected area consists of an identified rich ecosystem such as habitats of the flora and fauna that are protected and preserved under an appropriate management, in order to promise that such habitats in the ecosystem are secured. Protected areas are essential for the functioning ecosystems and support the provision of ecosystem services. Virtually, they are the cornerstones of all national and international conservation strategies, set aside to maintain functioning natural ecosystems (Dudley 2008). Protected areas can be degraded by external pressures, but the majority of the terrestrial and these areas are successful at stopping land clearing, and to a

lesser degree effective at mitigating logging, hunting, fires and grazing (NRE 2008).

National park serves as a significant part in the protected area framework and acts as a major function in the ecotourism. The existing of protected areas in Malaysia relies heavily on its national parks. The biodiversity of national parks, plays an important role in supporting domestic, national and international policies on conservation. In Malaysia, national parks act as public resources for recreation, education and preservation of natural resources such as endangered species plant and wildlife. With a great diversified ecosystem, national parks aid to the various scientific researches, tourism and recreation, protection of the wildlife as well as the natural and cultural resources of protected areas, plus maintaining the natural assets of the ecosystem (Yasak 1996).

The biggest challenge that lies in managing national parks is that the harmonizing ability between the pressures and threats with conservation objectives (NRE 2006). Conflicts between ecotourism and national park's conservation rises as ecotourism activities are heavily dependent on the natural abundances of the protected areas. Thus, the protection of bio-diversified ecosystem of the areas is very much dependent on the management competence of the area. Conservation and preservation of the environmental resources are essential for sustainable ecotourism and it requires an effective management. It is the responsibility of managers and authority to have good and balance management objectives that will not only please the needs and preferences of visitors, but to be able to benefit the local community, as well as to sustain the biodiversity conservation for sustainable ecotourism.

Virtually, there is no national park in Malaysia that generates enough income to cover all its cost (Backhaus 2005). National parks in Malaysia, although not all of them, impose entrance fees on their visitors. A differentiated fee system is available in most of the national parks that practice entrance fees, where foreigners would have to pay more than the local visitors. Furthermore, several extra fees must be paid in some of the national parks in order for tourism activities to take place such as; vehicle fee, camera and filming fee, boat and camping fee as well as fees for fishing permits. Yet, the entrance fees are comparatively low compared to the conservation costs.

Driven by the ecological degradation from ecotourism activities, the central motivation for this study is to estimate visitor's preferences for improvement in ecotourism and management in KNP by utilizing the economic valuation tools. This study offers to aid in further improvement of the present administration policies in the ecotourism development that shall contribute to the sustainable development and conservation in Malaysia's national parks, particularly in the state of Sarawak. The assessment of the natural resource's value at KNP is essential to understand the respondents' preferences for the attributes offer at the park. The information from the results of this research would help the policy makers and park wardens in implementing suitable management policies and guidelines, as well as in planning and managing conservation issues in Malaysian national parks.

Kubah National Park (KNP), Sarawak, gives a decent representation of tangible economic values for the green resources. It is situated on the southwest of Sarawak and distances about 22 kilometers away from the west of Sarawak's capital city, Kuching. On its 22 square kilometers territory, 98 types of palm trees have been recorded, which makes it one of the wealthiest palm natural surroundings on the planet (WWF-Malaysia 1998). Besides, the region offers a wide assortment of local greenery, for example, pitcher plants and *bintangor* trees, orang utan, feathered creatures, frogs and others.

The park is one of the standout amongst national parks due to the easy access from the Kuching city, due to the distance and the availability of sealed road to the area. The park was officially gazetted on 11th May 1989 and was only open to the public 6 years later in 1995. Apart being a national park itself, KNP comprises of a wildlife rehabilitation center, namely the Matang Wildlife Centre (MWC) on the west side of the park. This Centre was established in 1998 and it takes an extra 10 to 15 minutes from KNP's headquarters. This study will be conducted at KNP that will also include of the MWC. KNP contains, among the richest rainforests on earth. With the richness of the ecosystem, it is no doubt that KNP is made of diversified habitats consisting spectacular flora and fauna, crystal clear jungle streams, waterfalls and other great nature components. It is known to international botanists as the "world of palms" as it is the richest palm habitat for its size anywhere in the world, making it in place of an extremely important protected site for the palms. It is estimated that there are more than 100 species of palms around the forests of the park. Generally, there is an increasing trend in the number of visitors to KNP from 2003 to 2015 (Table 1).

LITERATURE REVIEW

The genesis of economic valuation of the environmental resources is made plausible from the existence of total economic value (TEV) concept. TEV of an ecosystem is grounded on the view of natural resources as a source of goods and services for consumption, and inputs for production (Beukering et al. 2007). The term was then widely used in the environmental economists. Nunes (2002) stated that the concept of TEV is based on the welfare economics theory and comprises of use value and non-use value (Alyward & Barbier 1992; Munasinghe 1993; Fennel 1999).

According to Pearce and Moran (1994), use values consist of the values arising from the actual use or

TABLE 1. Total Number of Visitors to Kubah National Park (KNP) and Matang Wildlife Centre (MWC)

Year	KNP			MWC			Grand
	Domestic	International	Total	Domestic	International	Total	Total
2003	3,914	433	4,347	23,828	1,231	25,059	29,406
2004	4,436	796	5,232	22,544	1,297	23,841	29,073
2005	4,436	823	4,347	16,077	3,696	19,773	24,120
2006	4,673	864	5,259	14,106	1,916	16,022	21,281
2007	4,095	993	5,088	15,347	2,979	18,326	23,414
2008	5,664	1,115	6,779	12,914	2,406	15,320	22,099
2009	5,138	1,349	6,487	11,741	2,012	13,753	20,240
2010	6,720	1,477	8,197	20,307	2,565	22,872	31,069
2011	6,647	2,047	8,694	29,590	5,556	35,146	43,840
2012	9, 686	5,931	15,617	19,735	3,180	22,915	38,532
2013	7,260	2,787	10,047	20,695	3,236	23,931	33,978
2014	9,147	3,481	12,628	28,834	5,059	33,893	46,521
2015*	6,599	1,854	8,453	16,170	1,855	18,025	26,478

Note: * Visitor's statistics up to July 2015
Source: Sarawak Forestry Corporation (2015)

consumption made of the environmental resource (Nunes 2002). In other words, use values are those values related to the concrete use of the natural resources such as recreational or health benefits (Munasinghe 1993). The use values are further divided into 'direct use value', 'indirect use value' and option value. Use values may be direct if the good or service is used directly to satisfy human needs. Whilst, non-use values refer to the values that human derived from the goods and services independent of any present or future use that people might make of those goods (Beukering et al. 2007). In other words, non-use values are non-marketable and intangible values which people derive from the preservation of environmental assets (Stevens et al. 1995). It usually divided between the bequest values and existence values and they both are quite difficult to define.

Economic valuation is conducted to assess the economic value of the public goods such as the environmental resource. It provides valuable information and knowledge on the values of the environmental goods and services and could be used to influence decision makers and policies on conservation and management of natural resources. However, there are only a certain number of environmental resources provide readily economic values in the market, whereas for some others, there are no market prices made available. The estimation of the values must be made through a non-market valuation technique. These methods can be classified according to whether they are revealed or stated preference techniques. Thus, in measuring environmental economic values such as national parks, stated preference is preferable due to its strong advantages.

Choice experiment (CE) is one of the choice modeling (CM) techniques under the stated preference valuation method. It is a tool to assign monetary values to environmental externalities. CE is closely associated to the dichotomous-contingent valuation method or often abbreviated as DC-CVM, as both methods include asking individuals to make mutually exclusive choices from a set of substitutable goods. The CE techniques have been used in a variety of research areas such as biology, psychology, and economics such as in health and environmental economics.

At the moment, studies relating to the CM techniques in Malaysia on environmental values are limited. For instance, studies like Othman et al. (2004), Othman (2007) and Yacob et al. (2008) are among of the studies that applied CM approaches to value the environmental resources. Othman et al. (2004) reviewed the management of Matang Mangrove Wetlands in Perak. Their study was to determine the optimal management strategy by applying the CM to evaluate the non-market values delivered under dissimilar management options. The study projected implicit prices for certain environmental attributes which includes of the region of green forest protected, the quantity of bird species protected as well as the recreational usage of the region. The results have proven that the CM approach is able to be successfully applied in developing countries as long as a cautious construction of the choice sets and effective data field collection is being done.

Othman (2007) applied the CM approach to measure the economic values of household preferences for improved solid waste management service attributes

in Malaysia. The survey involved 850 random urban household respondents in Seremban and Kajang. The results indicate that the households are WTP for a premium for improvements in the solid waste management service. The study also shows that the households derive positive utility from the provisions of recycling facilities and compulsory monthly curbside recycling. The results from this study could be used by the service providers to identify any disparity between the public wants and their WTP as well as the affordability of supply on the service providers' side. The latest economic literature for the valuation of environmental attributes is conducted by Yacob et al. (2008). The study estimates the economic values of ecotourism attributes and the benefits of the ecotourism development to the local people. Redang Island Marine Park was chosen as the research area. CE was applied in the study where both conditional logit and mixed logit models were applied to investigate the visitor's preferences of the ecotourism attributes. The findings show positive visitors' WTP for the management of marine parks and area's attributes and employment for local people. The results also show a strong significance and positive for the ecotourism facilities and service attributes.

METHODOLOGY

SAMPLE SIZE AND SURVEY DESIGN

Due to the high population as well as to avoid problems in identifying every member of the population, the study utilized stratified random sampling. The population from which the sample was sourced was the visitors of KNP. Visitors included both interviewed at KNP and MWC's headquarters itself. In 2012, there were about 38, 532 visitors who visited KNP and MWC. Respondents were informed that the research will help the government and in the end the national park's authority may be able to understand both user and non-user's expectation regarding the national park's attribute improvement. Data collection was conducted using face-to-face interviews where 350 questionnaires were distributed during the six-week survey (first week of March until the second week of April 2013). A structured questionnaire was developed and two enumerators were hired to assist the author in conducting the survey.

On-site face to face interviews with the visitors (local and foreign) was conducted at KNP. A pilot test was conducted in the first week of February 2013, before the formal field survey actually took place in the following weeks. Both pilot and formal interviews were conducted by two trained enumerators. Pilot test is important in order to eliminate any potential issues in constructing the final questionnaire set. The pilot test was done once and involved of 30 respondents to determine the appropriateness of the attribute levels in CE. A survey with a total of 30 respondents were involved in the pilot test. The pilot test's respondents were randomly selected from the study area. Furthermore, the pilot test itself could be considered as a warming up exercise for the enumerators to make them familiar with the topic, issues as well as the study area itself.

After a series of data screening stages, it is finally identified that only 303 responses out of the 350 completed data could be used in further analyses. The surveys were done at two separate sites that incorporate of KNP's headquarter and the MWC's Information Center. The main reason of why did the interviews was conducted at two different main locations were first, MWC is located in the boundary of KNP itself. Second, the visitors are required to pay only once for the entrance fee charges to enter these two areas, even though they choose to visit only one of the areas (either KNP or MWC). In order to enter the area, the visitors need to enlist at the entrance booth of either KNP or MWC, with some entrance fee charges. At the beginning of each interview session, respondents were informed of the purpose of the survey where the survey was to investigate how much there are willing to pay for improvement in the ecotourism and management (EMT) attributes' quality available at the park. They were also informed that their responses may help to improve policy making and decisions related to the park in the future. To add, the survey was administered in both Bahasa Malaysia and English as to reduce any language barriers and the choice of the language is based on the respondent's convenience and understanding. The questionnaire was divided into several sections such as the introduction and background of study, respondents' attitudinal information, CE questions as well as some questions on the respondents' background information.

CHOICE OF EXPERIMENTAL DESIGN

In this study, a series of multiple choices has been defined in order to help the respondents to select their preferred attributes and levels for KNP. The choice options for ecotourism and management attributes (EMT) varied based on the provided choice sets. Each choice set has three components such as attributes, alternatives and their respective levels (based on attribute). These choice sets consist of three alternatives of management options, with the inclusion of the status quo option. A status quo option indicates that the respondents opt for the current situation if they don't anticipate to have any changes or improvement of the current management options in place. An experimental design is typically 'orthogonal', which guarantees that the attributes offered to respondents are varied independently from one another and that the effect of each attribute is the level upon responses is more easily isolated. By having orthogonality, multi-collinearity between attributes could be avoided. Thus, the generation of the orthogonal design in this study is made possible with the help of the SPSS statistical software.

TABLE 2. Selected Ecotourism and Management Attributes (EMT) and Levels for KNP

Attributes	Attribute Levels	Current State
Amenities	Basic (AMT1) High (AMT2)	Basic
Information availability	Low (INFO1) Medium (INFO2) High (INFO3)	Low
Interpretive trails availability	Basic (ITA1) High (ITA2)	Basic
Park guide availability	Basic (PG1) High (PG2)	Basic
Entrance fee charges	No change (MPRICE1) Increase by 10% (MPRICE2) Increase by 20% (MPRICE3) Increase by 30% (MPRICE4)	No change

The orthogonal design consisted of both of complete factorial design (CFD) and fractional factorial design (FFD). The CFD scenario of this study would require 96 alternatives (three attributes at two levels, one attribute at three levels and one attribute at four levels, would consist of 2^3 3^1 4^1= 96). In the FFD, some of the interactions will be dropped out or elicited except for the main effects. Several 'useless' choices were dropped out, leaving only 10 choices for each EMT and NPC attributes. Useless choices are based on the following assumptions such as: (i) If the combination of each attribute displays low levels, but higher in entrance/conservation fee charges, and (ii) If the combination of each attribute displays high levels but lower in entrance/conservation fee charges. With these assumptions, the final design produced 10 options for EMT attributes. The EMT options are then divided further into 5 choice sets where each choice set comprises two proposed ecotourism and management options, as well as a status quo option. This means that there will be three unique options in a choice set differed in their attributes' levels and costs. Option 1 and 2 exhibit a number of combinations of management attribute along with marginal changes in the entrance fee charges. Option 3 is always the current situation (status quo) and involves no changes in entrance fee charges. All of the attributes and levels selected include the current state (status quo) of ecotourism and management attributes available at the park (Table 2).

MODEL SPECIFICATION

The CE shares a common theoretical context with the DC-CVM in the RUT (McFadden 1974) as well as a common basis of empirical analysis in limited dependent variable econometrics (Hanley et al. 2001). CE draw upon the probabilistic choice theory named as the random utility theory (RUT) and is consistent with the Lancaster's economic theory of value and neoclassical economics. The Lancaster's theory classifies the value of a good as a function of the attributes that describe the good rather than the good as a whole. In the meantime, the RUT aids to develop the best estimation of the unknown true utility function. It is directly linked with the utility function from the probability of choosing an alternative from a set of alternatives or profiles.

In assessing the CM method, conditional logit is typically used. Conditional logit is a multinomial logit (also known the McFadden's logit) is regarded as one of the simplest variations in the contingent choice method. To demonstrate, say in this research, a respondent (visitor) i, is given a choice of K alternatives, in a choice set. The label of observed attributes is characterized in either qualitative (ex. Low, medium, high, etc.) in an alternative k in a choice set provided to the respondent, where n acts as the vector of X_{ij}. The probability, P_{ij}, that the respondent n will select alternatives j depend on the observed attributes of alternative j compared to the other alternatives. Say in this case, there are three alternatives offered such as; Management Option 1, Management Option 2 and the Management Status Quo option. Thus, the probability of respondent i's may be illustrated as;

$$P_{ij} = f(X_{ij}, X_{kj}; k \neq i, \beta) \quad (1)$$

Where; P_{ij} denotes for probability of respondent i choosing alternative j, X_{ij} is a vector of observable characteristics of alternative j provided to respondent i, and X_{ik} is a vector of observable characteristics of alternatives k provided to respondent i. f is said to be the function that associates the observed data with the probabilities of choice. Furthermore, function f is specified up to some vector of taste parameter β to be estimated. The β parameters may be specified by estimating the marginal value of each ecotourism attribute in the respondent's choice set.

Thus, in order to derive a CE model or a specific function f in Equation (1) above, consider the utility gained by the respondent from each alternative. Say the vector of the entire attribute of alternative j as faced by respondent i is denoted as Z_{ij}. According to Lancaster (1966) the utility that respondent i obtains from alternative j, denoted as U_{ij} can be written as;

$$U_{ij} = U(Z_{ij}) \quad (2)$$

In a utility theory, the respondent will tend to choose an alternative that will maximize his or her utility. The behavioural model of the respondent i in choosing alternative j is given by $U_{ij} > U_{ik}$, where $k \neq j$. Thus, it can be written as;

$$U(Z_{ij}) > U(Z_{ik}); k \neq j \quad (3)$$

The utility function in Equation (3) denotes the deterministic component as the utility of the respondent is already known. Thus, the principle of the RUT states that for an indirect utility function (that is not directly observable) of each individual, given by $i(U)$, could be divided into two parts such as a deterministic or systematic element (V) and a stochastic element or random component (ε) (Hanley et al., 2001). Individual choices are made based on the characteristics of goods, together with some degree of randomness. In measuring the utility, individuals would have known or identified their utility function but due to the immeasurable attributes of the goods being valued, the random component would attribute to the element of randomness in the individuals' preferences. The unobserved components of the utility function will lead to incomplete information from the respondents. ε represents the unobservable influences on the respondent choice and is not known and therefore is treated as a random term or component. Thus, the respondents utility function (for respondent i) where the respondents are given a set of K alternatives ($j = 1,2,3,\ldots,K$) could be depicted as;

$$U_{ij} = V_{ij} + \varepsilon_{ij} \tag{4}$$

Where; U_{ij} denotes utility respondent i attained from alternative choice set j, V_{ij} is systematic/deterministic utility function and ε_{ij} denotes for random component/ error term. From Equation (4), the deterministic element (V) is specified as a linear index of the attributes (X) of the j^{th} different alternatives in the choice set, while the stochastic element is represented by the unobservable influences on individual choices (Hanley et al., 2001). It could be noted as;

$$U_{ij} = V_{ij}(X_{ij}) + \varepsilon_{ij} = bX_{ij} + \varepsilon_{ij} \tag{5}$$

In Equation (5), the socioeconomic variables could be included together with the choice set attributes, which is in the X terms. As the variables are constant across the choice occasions for any given individual, they can only be included as interaction terms, such as interactions with the specific choice attributes (Hanley et al. 2001).

Say, an individual will be probed to select between two alternative goods that are assumed to be different by their attributes and their levels, respectively. For example, in this paper two alternatives such as the quality of the amenities and the level of information availability, is denoted as g and h, respectively. Thus, the probability of that individual respondent selecting option g in the choice set to any alternative option h, can be expressed in Equation (6) as the probability to the utility related with option exceeds that related to all other options.

$$\begin{aligned} P_{ij} &= P[(U_{ig} > U_{ih}) \forall h \neq g] \\ &= P[(V_{ig} - V_{ih}) > (\varepsilon_{ih} - \varepsilon_{ig})] \end{aligned} \tag{6}$$

Equation (6) expresses that the probability of selecting to choose alternative j to k, which indicates that the probability of observed quantity is much greater than the probability of random error term since it is a cumulative distribution. In order to develop an explicit expression for this equation, it is essential to know the distribution of the error terms (ε_{ij}). Hence, the error terms are typically assumed to be independent and identically distributed (IID) with an extreme-value (Weibull distribution).

$$P(\varepsilon_{ij} \leq t) = F(t) = \exp[-\exp(-t)] \tag{7}$$

The distribution of the error terms in Equation (7) denotes that the probability of any particular alternative being selected as the most preferred and could be stated in terms of the logistic distribution (McFadden, 1974). The derivation of this logistic distribution is also known as the conditional logit model and can be expressed as;

$$P(U_{ig} > U_{ih}, \forall h \neq g) = \frac{\exp(\mu V_{ig})}{\sum_j \exp(\mu V_{ij})} \tag{8}$$

In Equation (8) is a parameter and it inversely proportional to the standard deviation of the error distribution. This scale parameter is usually cannot be separately identified. It is normally identified as one. The specification of the parameter highlights that the error terms are from the choice set must follow the Independence from the Irrelevance Analysis (IIA) property.

$$V_{ij} = \beta_{ij}X_{ij} + \beta_2 X_{2ij} + \ldots + \beta_k X_{kij} \tag{9}$$

Where; Xs are the variables in the utility function and βs denotes for the coefficients to be estimated. From Equation (9), the estimation of the βs reflects the effects on utility of a change in the level of each attribute. For instance, β_1 represents the utility effect of change in attribute x_1 (Hanley & Barbier 2009). The socioeconomic variable may be inserted along with the choice set attributes in the x term in Equation (9). However, since they are constant across choice occasions for any given individual, in this case income is the same as the first choice is made to the second; they can only be included as interaction terms (interacted with specific choice attributes). Once the parameter estimated have been obtained, a WTP compensating variation welfare measure that complies with the demand theory can be derived for each attribute by using the formula given as follows (Hanemann, 1984);

$$WTP = b_y^{-1} \ln \left\{ \frac{\sum_j \exp(V_i^1)}{\sum_j \exp(V_i^0)} \right\} \tag{10}$$

Where; V^0 is utility of the preliminary state, V^1 is utility of the alternative state, b_c is coefficient of any of the attributes and b_y is coefficient of the cost attributes that gives the marginal utility of income. It could be confirmed that for the linear utility index specified in Equation (5) the above formula of Equation (10) can be shortened to the ratio of coefficients given in Equation (11). For a marginal change in the attribute, the WTP

value is normally derived by dividing the b_c value of each non-monetary attributes by b_y value of the cost or price attribute. These coefficients are commonly known as implicit prices or marginal rate of substitution, MRS (Hanley & Barbier 2009). The ratio of an attribute and price coefficients denotes the marginal implicit price of the attributes.

$$\text{MRS} = \frac{-b_c}{b_y} \tag{11}$$

EMPIRICAL RESULTS

SOCIOECONOMIC CHARACTERISTICS

A summary of the socioeconomic profiles of respondents is presented in Table 3. The total number of respondents surveyed was 303 visitors. The respondents' interviewed ages 18 years and above, with the highest sampled age group fall in between 26 to 35 years old (38.6%). There are 49.8% male and 50.2% female respondents, signifying almost an equal share of both genders. This can be explained by the pattern of visitation where most of the respondents are likely to come with their partners and family. In terms of the education level, approximately near half of the respondents are undergraduate degree holders (48.5%), followed by 28.1% of respondents with secondary education level, 23.1% attained postgraduate education and finally 0.3% of respondents with primary education level.

The respondents' employment status is a significant variable as it is very much likely associated with both respondents' income and education level. The top percentage that covers 88.8% of visitors was recorded to be employed. Only a minor population of the sample is categorized as unemployed (either not working/seeking for work/retired). This is a result of trained enumerators whom has been unmistakably reminded to not distribute their questionnaires to students and individuals below the age of 18 years old as they were likely not working and thus, reveal no income.

In terms of the total monthly income, the ranges were classified into four sets of income groups that comprise of; (i) total monthly income less than MYR3,000 (low); (ii) total monthly income between MYR3,000 to MYR6,000 (medium); (iii) total monthly income between MYR6,001 to MYR9,000 (high); and (iv) total monthly income more than MYR9,000 (very high). 'Most of the interviewed visitors placed within the low or very high income group (38.3% and 35.4%, respectively). An almost equal portion in these two income clusters might be due to the presence of foreign visitors whose salary were comparatively higher due to currency exchange rate as compared to the Malaysian Ringgit (MYR).

CHOICE EXPERIMENT RESULTS

Table 4 shows the results of Model 1 (simple model) and Model 2 (interaction model) of the conditional logit (CLGT) models. It explains for the visitors' choices for

TABLE 3. Socioeconomic Profiles of Respondents

Variable		Visitors (n = 303)	
		Frequency	(%)
Gender	Male	151	49.8
	Female	152	50.2
Age group	18 to 25 years old	42	13.9
	26 to 35 years old	117	38.6
	36 to 45 years old	88	29.0
	46 to 55 years old	48	15.8
	56 to 65 years old	6	2.0
	More than 65 years old	2	0.7
Education level	Primary school	1	0.3
	Secondary school	85	28.1
	Undergraduate degree	147	48.5
	Postgraduate degree	70	23.1
Working status	Employed	269	88.8
	Unemployed	12	4.0
	Retired	18	5.9
	Other	4	1.3
Total monthly income	< MYR3,000 (Low)	116	38.3
	MYR3,000 to MYR6,000 (Medium)	68	22.4
	MYR6,001 to MYR9,000 (High)	42	13.9
	> MYR9,000 (Very high)	77	25.4
Nationality	Domestic (Malaysian)	106	35.0
	International (Foreigner)	197	65.0

TABLE 4. Results for Simple and Interaction Conditional Logit Models

Variables	Conditional Logit			
	Model 1		Model 2	
	Coefficient	t-value	Coefficient	t-value
AMT2	0.3188	4.322***	0.3228	4.369***
INFO2	0.7009	4.649***	0.3785	1.810*
INFO3	0.9817	9.178***	0.9860	9.210***
ITA2	0.4281	4.651***	0.4266	4.634***
PG2	0.6115	7.401***	0.6191	7.456***
MPRICE	–0.0138	–2.663**	–0.0142	–2.728**
INFO2_INC	-	-	0.0001	2.155**
Summary Statistics				
No. of observations	1570		1570	
Log Likelihood	–1546.852		–1544.507	
Log Likelihood, No Coefficients	–1724.8213		–1724.8213	
Pseudo R^2	0.1032		0.1045	
Adjusted Pseudo R^2	0.1015		0.1025	

Note: *, ** and *** denotes significant at 10%, 5% and 1% level, respectively.

the EMT attributes in the study. The coefficient for the monetary attribute for EMT services were also included and denoted as MPRICE in the table. A likelihood ratio test of the joint significance of the variables estimated a likelihood ratio statistic value of 355.94 against 18.474, the critical chi-squared value at 1% level of significance and 5 degrees of freedom for the visitor's simple model. These results reject the null hypothesis that the marginal effects are jointly zero.

In order to realize a more accurate specification for the simple model, socioeconomic characteristics of respondents were added in the specification. Rolfe et al. (2000) suggested that although the addition of socioeconomic parameters is simple, it is an essential step in estimating a more precise model of choice. In addition to the selection of options 1, 2 or 3, respondents were also given identical socioeconomic questions, in each of the choice question. Hence, this study utilized 'general to specific' approach for detailed estimation. The decisions were to drop the insignificant variables for future model estimation until the EMT interaction models produced all significant variables in the final model, except the main EMT attributes were retained towards the end. The results from this inclusion can be seen in Model 2 (Table 4).

In order to further examine the data for the management CLGT models for both models, the overall goodness-of-fit was examined. The goodness-of-fit of the simple EMT model could be detected by McFadden's (1974) statistics. The value of Pseudo statistics could range from a minimum of 0 to a maximum of 1 (but it will never reach or close to either 0 or 1, as a result of its calculation). To add, a Pseudo value between 0.2 and 0.4 could be measured as an extremely good model fit (Louviere et al., 2000). Based on the results in Table 4, it specifies that the level of the independent variable power is comparatively low with Pseudo value of 0.1032 (Model 1) and 0.1045 (Model 2). Additionally, the Pseudo value changed slightly from 0.1015 in simple model to 0.1025 in interaction model. Yet, both values acknowledge the model fits the data well. Gujarati (1999) stated that the larger the number of the explanatory variables in a model, the higher the result for would be. Nevertheless, this account shall not be taken seriously as does not consider the 'degrees of freedom'.

Generally, it can be concluded that most of the coefficients for all main attributes in both models are statistically significant at 1% level, with the exception of MPRICE in both models and INFO2 in Model 2. In addition, the higher levels of each attribute, the higher the coefficients of the attributes are. For instance, AMT2 yields higher positive coefficients in both models, significant at 1% level. This means that AMT2 are in favored compared to AMT1 as base level (*status quo*). This displays that the visitors choose to have improvement in terms of the level of amenities at KNP as they realized the importance of having better amenities while visiting the park. Poor amenity levels may disrupt the respondent's quality time at the park.

There are also higher coefficients for INFO2 (medium level) and INFO3 (high level) compared to the base level, in both models. The main attribute for INFO2 (level 2) display positive sign, suggesting that visitors prefer 'medium' rather than 'low' information availability level (current situation). Furthermore, the coefficients for ITA2 and PG2 are also higher in both models as compared to the base level, ITA1 and PG1, respectively. The coefficient of

ITA2 is also positive in its relation in both models, as they decide to move away from the current level of ITA (status quo) to high level (ITA2). This implies that respondents prefer an improvement in the limited quantity of iterative trails provision along the trails in KNP at the level. Another main attribute PG2 (level 2) also demonstrates a positive sign in the function, suggesting that respondents prefer 'provided for group of 8 to 10 with charges' rather than 'available upon request with charges' for the park guide services. The availability of park guide for respondents in big group may help not only in assisting with guided tours, but also in supervising the security of public visits as well.

The interactions with socioeconomic factors produce only one significant variable with a positive relationship in Model 2. Model 2 shows INFO2_INC produced a positive sign at 1% level, which specify that visitors with higher household income prefer for better quality for the information availability of the park. Consequently, it is in line with the standard assumption of economic theory which states that one's willingness to pay increases with his or her level of income. To highlight, the monetary attributes (MPRICE) also produced expected negative signs in both models. The coefficient MPRICE in the visitor's sample was significant at the 5 % level. This means that as the entrance fee charges rises, respondents are unlikely to contribute due to the reduction in the utility level. Adding MPRICE as one of the factors that affect the probability of choice serves a basis in estimating the economic value of each of the EMT attribute levels.

Conditional logit model estimations allow for the calculation of marginal rate of substitution (MRS). This MRS can be calculated from the estimated coefficients for all attributes and were used to estimate the effect of changes in attributes based on how much the respondents are willing to pay for entrance or conservation fee charges, in order to have improvement in EMT (whilst maintaining the same level of utility). Respondents are to select the amount of trade-off to show how much they are willing to pay for an increase in price with a number of improvement proposals for EMT attributes in KNP. This marginal implicit price of the EMT attributes can be calculated by dividing the estimated coefficient of the non-monetary attributes with monetary attribute and can be estimated by using the following formula (refer Equation (11)). Accordingly, the MRS between other EMT main attributes (AMT2, INFO2, INFO3, ITA2 and PG2) and monetary attribute MPRICE is regressed by utilizing Wald test in LIMDEP software. Thus, the MRS between the EMT attributes and entrance fee charges (MPRICE) is being estimated and the following Table 5 reports for these MRS estimations. However, in measuring the monetary tradeoff between two or more attribute levels, the MRS are calculated by dividing the difference between the two or more attribute levels' coefficients by the price (entrance fee charges).

Table 5 shows the outcomes for both Model 1 and Model 2, for assessed marginal values of the distinction in EMT attributes' levels, separately. It is important to take note that the estimated values uncover partial monetary trade-offs and it is accepted that other attribute levels stay consistent (*ceteris paribus*). It should be noted that the marginal values for the EMT attributes are measured in percentages (%) as the changes in monetary attribute (entrance fee charges, MPRICE) were asked in percentage change from the current existing charges in KNP. Currently, the entrance fee charges per entry to KNP and MWC is MYR10 and MYR20 to Malaysian and foreign visitors, respectively.

TABLE 5. Marginal Rate of Substitution (%) for Ecotourism and Management Attributes

	Conditional Logit	
Variables	Simple Model (Model 1) %	Interaction Model (Model 2) %
Amenities (AMT)		
AMT1 → AMT2 *Basic to high*	23.1	22.7
Information availability (INFO)		
INFO1 → INFO2 *Low to medium*	0.8	26.6
INFO2 → INFO3 *Medium to high*	20.4	42.8
Iterative trails availability (IT)		
ITA1 → ITA2 *Basic to high*	31.0	30.0
Park guide availability (PG)		
PG1 → PG2 *Basic to high*	44.3	43.6

The payment vehicle for EMT attributes quality improvement simply uses an increase in entrance fee charges. For the 'amenities' (AMT) attribute, the result of MRS for 'basic to high' level is at 23.1% in Model 1. This value illustrates for how much visitors' willingness to pay for an improvement in the amenities' feature. This value of 23.1% shows that the willingness to pay among domestic (Malaysian) visitors is about MYR2.31. Whilst, the international (foreign) foreign visitors are likely to pay an extra of MYR4.62 for a better quality of amenities at KNP. Additionally, in Model 2, a slight difference in the MRS value can be seen at 22.7% (MYR2.27 and MYR4.54 for domestic and international visitors, respectively) for changes from 'basic to high' level. Consequently, an average of 22.9% for MRS in both simple and interaction models (Model 1 and Model 2).

Presently, the general and specific information about KNP such as its natural attractions, flora and fauna, and etc. is insufficient and limited to a certain quantity of interpretative maps and signboards. In Table 5, there were two changes in information availability about KNP attribute levels opposed. The MRS of difference between 'low to medium' (INFO1 to INFO2) is 50.8% (Model 1) and 26.6% (Model 1). The total for the difference between 'medium to high' (INFO2 to INFO3) in both models are 20.4% and 42.8%, respectively. On average, all these deviations of improvements in both models, starting from the 'low to medium' is 38.7% and 'medium to high' is 23.8%. These results display that the improvement most highly preferred by visitors in providing information availability in KNP is from the 'low to medium' level rather than from 'medium to high' level. Information regarding KNP should be in such interpretive maps, signboards and pamphlets rather than just insufficient of those was most preferred by respondents.

The result of the MRS level for 'iterative trails availability' of 'basic to high' is at 31.0 % in Model 1, indicating that Malaysian visitors and foreign visitors are willing to pay MYR3.10 and MYR6.28, respectively. The interaction model, Model 2, give lower values of MRS in comparison with the simple models, Model 1 (a slight decrement in value by 1.0%). The MRS value in the interaction model is probably caused by the inclusion of socioeconomic parameters in the interaction models. It can be concluded that most of the respondents are willing to contribute about 30% more of the entrance fee charges in order to have improvement in quality of iterative trails availability attribute.

Moreover, the 'park guide availability' attribute in KNP is available upon request with certain charges. This has been set as a base level in this study in the 'park guide availability' attribute level. Model 1 shows MRS of 44.3% and could be interpreted as the Malaysian and foreign visitors are willing to contribute an addition of MYR4.43 and MYR8.86, correspondingly. The MRS values in interaction model also produced a difference as compared to the one in the simple model. Interaction models gave slightly lower value due to the adding of socioeconomic variables in the CLGT estimation.

CONCLUSION

The central motivation for this paper is to estimate visitors' preferences for improvement in ecotourism and management attributes (EMT) in Kubah National Park, Sarawak. In general, the findings show that respondents are in support for improvement in management aspects and are willing to pay for hypothetical proposed prices. The respondents are aware of the importance of protecting and good management of the studied area. Thus, they support for changes or improvement in the current management condition which are currently provided at a basic or low level only.

Results from the socioeconomic profiles of the respondents are essential not only for the management authorities in KNP, but also act as an important key in marketing strategies for ecotourism operators and national park's authorities. In the choice experiment models, choices were explained by multiple attributes, plus the interactions with socioeconomic variables. As a result, the choice experiment models are capable to estimate the welfare benefits of different programs by changing the attribute levels for future concern in the policy review. In a nutshell, it seems that results deduce that the visitors of Kubah National Park are aware of the importance of protecting and enhancing the quality of ecotourism and management attributes. The respondent's intention to enhance the status of the current status is positive to the highest level. For instance, based on the results in Model 1, the utmost visitor's preference for different attribute levels with 50.8% of the entrance fee charges is for the information availability improvement from low level (INFO1) to high level (INFO2). Whilst the second highest preferred improvement for the ecotourism and management attributes was for the park guide availability attribute, from basic level (PG1) to high level (PG2), with 44.3% more of the current entrance fee charges.

The economic valuation procedures in this study elicit the economic values in terms of visitor's willingness to pay for entering Kubah National Park. Thus, this estimation was not easily generated. An effective management of national parks depends heavily on a comprehensive understanding of the goods and services they offer to the people. In order to realize the aim of an effective management, it is essential for policy makers and national park authorities to understand the tradeoff between the visitor's preferences for the protection and conservation of biodiversity as well as the development in the area for ecotourism purposes. The estimated willingness to pay in this study offers assistance to policy makers and national park's authorities to revise the current entrance fee charges. In general, respondents are willing to contribute

more for improvement for ecotourism and management attributes' in KNP. The policy makers and authorities may perceive this as a positive cooperation from the visitors to contribute more money, provided that the monetary values shall improve several management aspects in KNP itself. Good management practices do not only include an effective, sustainable management and conservation services but as well as sustainable ecotourism. Thus, it requires a comprehensive plan and actions in management for long term benefits. This would satisfy the visitors who were willing to pay for the improved programs as they are assured that their contribution benefits the park. Thus, in order to have an efficient policy, national park's authorities should also balance the improvement in the ecotourism and management aspects with the affordability of the visitors itself

REFERENCES

Alyward, B., & Barbier, E. B. 1992. Valuing environmental functions in developing countries. *Biodiversity and Conservation* 1: 34–50.

Backhaus, N. 2005. *Tourism and Nature Conservation in Malaysian National Parks.* Die Deutsche Bibliothek.

Beukering, P. v., Brander, L., Tompkins, E., & McKenzie, E. 2007. *Valuing the Environment in Small Islands: An Environmental Economics Toolkit.* Peterborough, United Kingdom: Joint Nature Conservation Committee.

Dudley, N. 2008. *Guidelines for Applying Protected Area Management Categories.* Gland, Switzerland: IUCN The World Conservation Union.

Fennell, D. 1999. *Ecotourism: An Introduction.* London: Routledge.

Gujarati, D. 1999. *Essentials of Econometrics*. 2nd edition. New York: Mc GrawHill.

Hanemann, W. M. 1984. Discrete/continuous models of consumer demand. *Econometrica* 52(3): 541–561.

Hanemann, W. M. 1984. Welfare evaluations in contingent valuation experiments with discrete response . *American Journal of Agricultural Economics* 66(3): 332–341.

Hanley, N., & Barbier, E. B. 2010. *Pricing Nature: Cost Benefit Analysis and the Environment.* Northampton, MA (USA): Edward Elgar.

Hanley, N., Mourato, S., & Wright, R. E. 2001. Choice modelling approaches: A superior alternative for environmental valuation? *Journal of Economic Surveys* 15(3): 435–462.

Lancaster, K. J. 1966. A new approach to consumer theory. *Journal of Political Economy*: 132-157.

Louviere, J., Hensher, D., & Swait, J. 2000. *Stated Choice Methods: Analysis and Application*. Cambridge: Cambridge University Press.

McFadden, D. 1974. Conditional Logit Analysis of Qualitative Choice Behavior. In *Frontiers in Econometrics*, edited by Zarembka, 105-142. New York: Academic Press.

Munasinghe, M. 1993. *Environmental Economics and Sustainable Development.* Washington, D.C. USA: World Bank.

NRE. 2006. *Management Effectiveness Assessment of National and State Parks in Malaysia.* Conservation and Environmental Management Division. Putrajaya, Malaysia: Ministry of Natural Resources and Environment.

NRE. 2008. *A Common Vision on Biodiversity in Government and the Development Process: Reference Document for Planners, Decision-Makers & Practitioners.* Putrajaya, Malaysia: The Ministry of Natural Resources and Environment.

Nunes, P. A. 2002. *The Contingent Valuation of National Parks: Assessing the Warmglow Propensity Factor.* Massachusetts: Edward Elgar .

Othman, J. 2007. Economic valuation of household preference for solid waste management in Malaysia: A choice modelling approach. *International Journal of Management Studies* 14 (1): 189–212.

Othman, J., Bennett, J., & Blamey, R. 2004. Environmental values and resource management options: A choice modelling experience in Malaysia. *Environment and Development Economics* 9(6): 803–824.

Pearce, D. & Moran, D. 1994. The economic value of biodiversity *Journal of Tropical Ecology* 11: 471–472.

SFC. 2015. *Visitors to National Parks in Sarawak.* Kuching: Sarawak Forest Corporation.

WWF Malaysia. 1998. *The national parks and other wild place in Malaysia.* London: New Holland Publishers (UK) Ltd.

Yacob, M. R., Radam, A., & Awang, K. W. 2008. *Economic Valuation of Marine Parks Ecotourism Malaysia: The Case of Redang Island Marine Park.* Serdang: Universiti Putra Malaysia Press.

Yasak, M. N. 1996. The development of ecotourism in Malaysia. In ESCAP, *Tourism Promotion in Countries in an Early Stage of Tourism Development*, 84-87. Ho Chi Minh: United Nations.

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