Marine Park Visitors' Trade-off among Marine Ecological Attributes in Malaysia

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Abstract

The central theme of this study is economic valuation of ecological function values through ecological attributes and biophysical indicators; as predicted in the strategic plan 2011-2015 of Department of Marine Park Malaysia (DMPM). So that, visitors of Perhentian Island Marine Park (PIMP) held for these attributes. Applying non-market valuation technique i.e. choice modelling stated preference technique has been pursued to achieve this objective. The total collected data consist of 380 Questionnaires that have been completed by visitors through a face-to-face interview in two main islands. Results of Multinomial Logit Models indicated that greatest visitors' preference for difference attribute levels was respectively for coral cover and water quality improvement in the highest level. This economic valuation can provide invaluable support to the conservation efforts in direction of maintenance biodiversity to stockholders including policymakers and tour operators.

Key Words: Willingness to Pay, Perhentian Island Marine Park, Choice Modelling Stated Preference Technique, Multinomial Logit Model, Ecological Attributes

1.1 Introduction

Maritime boundaries have created marine opportunity for Malaysia. Marine ecosystem that marine parks are a section of it has multiple functions. Primary attractions of ecotourism are flora, fauna and heritage that are destination of visitors. Marine Parks in Malaysia can be attractive especially for ecotourism and international visitors (Table 1).

Table 1: The trend of total tourism and visitors of Marine Park in Malaysia

Years	Tourist Arrival (million)	Tourist Receipts (RM# billion)	Visitors of Marine Park Malaysia
2000	10.22	17.3	423,229
2001	12.78	24.2	484,121
2002	13.29	25.8	465,587
2003	10.58	21.3	381,072
2004	15.70	29.7	559,862
2005	16.43	32.0	429,880
2006	17.55	36.3	520,015
2007	20.97	46.1	477,682
2008	22.05	49.6	508,488
2009	23.65	53.4	530,758
2010	24.58	56.5	606,155
2011	24.71	58.3	584,934
2012	25.03	60.6	626,605

Sources: Tourism Malaysia, (2012) and Department of Marine Park Malaysia, (2012)
Ringgit Malaysia, Malaysian Currency;

Seventeen countries including Malaysia had been recognized as mega-diverse countries by the World Conservation Monitoring Centre (WCMC) in July 2001 (Williams, 2001). The number of coral species identified in the East Coast of Peninsular Malaysia is approximately 80% of equivalent number of species in the sites that has been identified in the Coral Triangle (Harborne *et al*., 2000). In addition, approximately one-third of total species of fish found in the world makes coral reefs as their home. Furthermore, about 25% of marine life is found in the world, coral reefs as their habitat for nursing and breeding (Reef Check Malaysia, 2010). Over 360 species of coral has estimated in Peninsular Malaysia and 1094 species of marine fishes estimated in Malaysia as well (Reef Check Malaysia, 2009).

Since, according to Barbier (2005) ecosystem services which have been known as great economic assets, are a part of natural capital; and as a production factor can contributes in economic system or human welfare (Arabamiry, Yacob, Radam, Samdin and Shuib, 2009); hence marine areas are important, because they are a section of natural capitals. Goods and services produced by marine areas are common property resources. If the demand for these resources takes place simultaneously, the capacity of these resources would be exhausted eventually; because, access to marine resources (e.g. wildlife habitat, threatened species and nutrient cycling) is open and free of charge. Or/and sometimes, with absence of real price. Here market failure concept (Kahn, 2005) is held, and market cannot lead to the best allocation of resources. However, at present based on Act 1951 and fee order in 2003, there is a conservation fee for some marine parks in Malaysia (Redang, Tioman, Payar, Perhentian and Sabah), i.e. RM5 for adults and RM2 for others, RM5.00 (Us$= RM 3.2) except for the residents of the islands encompassed by the Marine Parks.

Sustainable fund is essential factor for DMPM to achieve its given obligations and responsibilities as ecological management in marine parks in Malaysia. Maine resources such as coral, turtles, fish species and water quality effectively contribute to human welfare. To assign monetary values to these non-market goods and services, various economic valuation techniques have been employed. Thus, for the Marine Park non-market good, the money value can be realized through economic valuation via people's willingness to pay. Rational consumer make decisions which maximize their utilities; this is the base of discrete choice models (Choice Modelling (CM)) (Train, 2009) of stated preference techniques. Therefore, applying the random utility theory is an attempt that will be examined in this study.

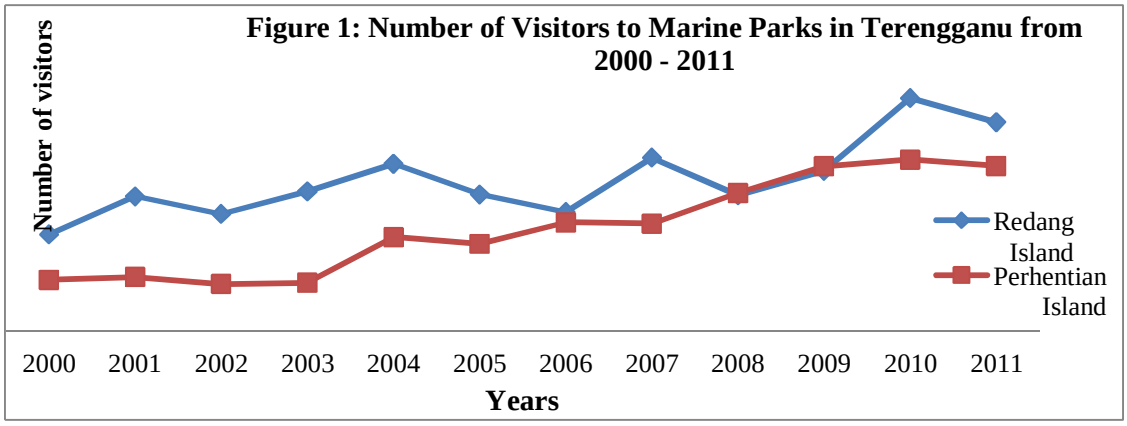
1.2 The Situation of Case Study Site

Terengganu marine parks which located in the Peninsular Malaysia are the first protected marine parks in Malaysia. Due to the richness of coral species in East Coast of Peninsular Malaysia, this area has global importance (Takushi, 2000). Coral cover which indicates reef health as an index or gross surrogate, is in fair condition in Pulau Redang, Tioman and Perhentian marine parks respectively with 40.2%, 36.6% and 32.8% coral cover (Department of Marine Park Malaysia (DMPM), 2011).

Because of bleaching coral in two states in East Coast of Peninsular Malaysia (i.e. Terengganu and Pahang), some of the coral areas in marine parks have been closed for visitors in 2010. In addition, human activities on the islands, such as sewage (Hui, 2008) and mechanical damages (e.g. submarine freshwater pipelines) have also affected the coral life and water quality. Moreover, the felling of trees causes the reduction in coral growth due to rain water which carries fine soil into the coastal zone, whereby sediment prevents light from reaching the benthos resulting in high concentration of sedimentation that can kill corals (Harborne *et al*., 2000).

PIMP is located 21 Km off the Terengganu's coast. The mainland point of embarkation is Kuala Besut that located about 459 km far from Kuala Lumpur. From the mainland to Perhentian Kechil and Perhentian Besar, it takes about 30- 45 minutes by boat. Abundance marine life in this tropical island provides ecological and biophysical opportunities for nature lovers and researchers. Besides that, the sandy beach island provides activities, such as snorkelling, swimming, diving, jungle tracking and other recreational activities to users. PIMP is more attractive for international visitors since, 62% of the visitors of Pulau Perhentian were international visitors in 2011 (Ab Rahim, B. G. Y, personal communication, October 17, 2012).

Ecological attributes which are the main attraction for tourism, with more than 50 species of corals identified in this area (Harborne *et al*., 2000). Hin and Sa (2001) pointed out Perhentian located in Indo-Malayan faunal triangle. Hence, its biological diversity importance is because of coral reefs, mangroves and estuaries. Whereas, Takushi (2000) indicated approximately 500 reef-building coral species and some rare fauna species of marine life only can be found in Perhentian. Moreover, six sandy beaches are the spots for laying eggs of turtle species. The area between Perhentian Kecil and Besar where boating activities are heaviest, are the area for mating of turtles. According to Hin and Sa (2001) in the tourism peak season, the society of villagers can be dominated by tourist population. Generally, there is an increasing trend in the number of visitors' to the marine parks of Terengganu from 2000 to 2011 (Figure 1).



Sources: Ab Rahim, B. G. Y, personal communication (October 17, 2012)

2. Techniques of Non-market Valuation Environmental Goods

Determination of the value and effective allocation of resources to produce each good is based on the market mechanism. In economics in which money is a measure of welfare, Bateman *et al*.(2002) indicated that benefits can be measured through the willingness to pay (WTP) for the benefits that individuals received, and in order to compensate for the forgone benefits the measurement is through Willingness to Accept (WTA). Thus, in order to increase the quantity/quality of goods and services as indicated by the demand curve, individual's preferences are determined through the amount of WTP. However Beaumont *et al*. (2007) believe that, as a straight forward task, identification and qualification of marine and coastal ecosystems of goods and services are not yet established. Kaur and Basiron (2008) indicated that the marine park in Malaysia and consequently their management have faced with some threats from tourism industry and recreational activities, coastal development, marine pollution, land based pollution, destructive fishing and over-exploitation. Resources should not be allocated to a non-market choice (conservation/recreation) policy, programme and project, if more values could be extracted by allocating the resource in different options and alternatives.

In an efficient decision making among options and alternatives, cost effectiveness is fundamental because of opportunity cost for an efficient decision making (Bateman *et al*., 2002).

Bateman *et al*. (2002) stated that due to a policy, project, programme and plan well-being can be affected via any change. Total Economic Value (TEV) defines the net sum of all the relevant WTPs and WTAs of this change. In fact, after passing the CBA test incorporating the Total Economic Values (TEV) in a project, the policy or plan will be implemented. TEV of Marine Ecosystem Ecological functions and coastal areas are categories to Use Value and Non-Use Value. According to Bateman *et al*. (2002) these components are divided to subsections (Arabamiry, Khalid, Alias, and Khademfar, 2013). In the literature, biodiversity maintenance, waste treatment, and assimilation are ecological function values which belong to the indirect use value category. The ecological function values are somewhat arbitrary: "whereas the community may also express some willingness to pay for these ecological function values even if some of the community are not directly affected... therefore, becomes somewhat arbitrary separating studies between those of ecological function values and those of non-use values (Hassall & Associates Pty Ltd, 2001, p.11-12). Thus, it could be argued that this study is going to estimate the direct as well as the indirect use value of PIMP.

Non-market environmental goods and services can be valued via various methods (Gibson and Burton, 2009). Stated preference and revealed preference are two approaches to estimate the values of non-market goods and services, such as public goods. Contingent Valuation Method (CVM) and CM are two main procedures of stated preference techniques (Adamowicz, 2004); in which the hypothetical environment change for values are assessed through a survey based on a scenario to elicit individual values (Bennett, 1999). Among the non-market valuation methods, CM is more preferred approach because of some reported advantages; for instance reduction in some bias that may occur in CVM (Bennett and Gillespie, 2011). For instance, Hanley, Mourato, and Wright (2001) pointed out that CVM is still a powerful methodology but others stated that flexibility and capability of CM have caused the increasingly common use of this non-market valuation technique to estimate environmental value commonly (Rogers and Cleland, 2010).

Because of the non-rivalry and non-excludability characteristics of these goods and random utility theory, choice probability is being implemented to estimate individual preferences. CM of stated preference approach as a tool allows the incorporation of policy decision. However, in many references e.g. Gillespie and Bennett (2011) indicated in marine park areas, there are relatively few CM studies conducted; for instance, Gazzani and Marinova (2007), McCartney (2009), Rolfe and Windle (2010), as well as Wallmo and Edwards (2008). It seems that in Malaysia the first attempt using CM has been done by Yacob, Radam, and Awang (2008) in marine park environmental goods valuation. Therefore, by the first strategic plan of DMPM and introducing KPI in it, it would seem that the first effort to take account of environmental valuation of ecosystem functions (ecological attributes and KPI as their levels) using CM is to be done in this study.

In choice modelling, each alternative is a combination of attributes and their levels. Choice sets are constructed with alternatives. Since each alternative in each choice set is unique, thus each alternative can be considered as a scenario. Individual make choice preferred option or alternative in each choice set. By choosing a preferred alternative, in fact individual trade-off among levels of attributes that presented in different alternatives in each choice set. Often, one of the attributes in the alternative represents money value. Therefore, the results of economic valuation as Garrod (2002) indicated for ecotourism, in this study can represent the user's WTP (or preferences), values of marine ecosystem function which can be used to assess policy toward ecological and biophysical in national and international arena.

3. Methodology

By utilizing marginal trade between attributes (McCartney, 2009), CM has the ability to present useful information. Therefore, CM outweighs among the other stated preference techniques.

3.1 Choice Modelling as a Methodology

Instead of estimating the value of goods as a whole like CVM, the values of different attributes of goods are considered in CM (Bateman *et al*., 2002; Morrison, Bennett, and Blamey, 1997). According to Bennett and Blamey (2001) the format of questionnaire design is similar in to both stated preference techniques, but with regard to WTP and a proposed change to environmental goods, a series of choice sets are presented to respondents which consist of various changes to the attributes of environmental goods that are proposed to the choice sets in CM.

3.1.1 Choice Modelling Experimental Design

The first and most important stage in CM survey design in which all subsequent activities will be affected by it, perhaps, is the definition of attributes, especially with regard to an environmental case study. "… [it is] important to insure that the attributes are relevant to policy makers, consistent with policy instrument, in line with the environmental variables that scientists use to predict outcomes of different Natural Resource Management action and suitable for use in Natural Resource Management modelling tools" (Mazur and Bennett, 2009, p.6-7) which perceives its importance. Therefore, four ecological attributes and the entrance fee, under revision in DMPM, have been considered as the attributes (Hensher, Rose, and Greene, 2005; McCartney, 2009; Yacob *et al*., 2008) in this study.

Appropriate attribute levels can be selected by the focus groups, with expert consultation, policy survey, and literature review (Hanley *et al*., 2001). Therefore, based on KPI in the Strategic Plan of DMPM, personal communication (Ab Rahim, B. G.Y, February 15, 2012), and literature (McCartney, 2009) levels of attributes have been selected. So that, three levels for each ecologic attributes as 0% or baseline, 5%, and10% improvement; and four levels for cost or entrance fee i.e. RM5 or current situation, 10, 15, and RM30 have been selected for this survey. Because they are realistic, practical and achievable (Bateman *et al*., 2002). Furthermore, Employing Key Performance Indicators (KPIs) in marine park management is useful to ease a non-scientific study and identify the health of each organism and also to measure and provide information for different sites.

Due to the limitations of full factorial design, a fractional factorial main effect has been followed for experimental design. The optimal recommended choice sets regarding complexity of work at hand are nine or ten choice sets (Caussade, Ortúzar, Rizzi, and Hensher, 2005; McCartney, 2009). Experimental design will be larger when larger numbers of attributes and levels for each attribute are employed. For example, the options between four to six will yield the most consistent answers (Smith and Desvousges, 1987). Moreover, Othman (2002) found in CM, the respondents having more than five choice sets cannot be taken as samples. While, Yacob *et al*. (2008) survey in Redang Island Marine Park indicated about seven choice sets can be used in CM in Malaysia. In this study, in a focus group that the majority of them believed two alternatives in each choice set (excluding *status quo*) can be reasonable because they give more information regarding respondents' preferences as compared with more alternatives. Comparison among options will be easier for the respondents. After an orthogonal design with SPSS software, in this study to prevent cognitive burden; and according to Rolfe and Bennett (2009) in order to prevent to choose *status quo* or non-participation repeatedly, a *status quo* and two other options have been chosen as the alternatives (or options) in a choice sets. In each choice set, each attribute varies across alternatives. in order ascertaining the respondents' perceptions of choice questions, debriefing questions (Landry and List, 2007), can be utilized. Therefore, in order to explain preference heterogeneity some relevant covariates by allowing socio-demographic interaction through some aspects have been drawn.

3.1.2 Multinomial Logit Model Specification

Since, the main theoretical basis for Attribute-Based Stated Choice Model (Bateman *et al*., 2002); Hensher *et al*. (2005); Adamowicz and Boxall (2001)) is random utility theory (RUT), thus econometric structure of CM can be characterized by individual utility; which deterministic (and observable) component and unobservable or stochastic component are the components of it (Adamowicz and Boxall, 2001). By defining one of the attributes as the price or cost terms, valuation of environmental goods can be done (Hanley, Wright, and Koop, 2002). Rational consumer will choose alternatives that provide them with the greatest utility. McFadden (1973) and Train (2009, p.40- 41) pointed out that the "probability of any particular alternative i being chosen as the most preferred can be expressed in terms of logistic distribution." thus, specified conditional logit model can be as follows:

$$P_{in} = \frac{\exp(\mu V_{in})}{\sum_j^J \exp(\mu V_{in})} \quad (1)$$

Or :

$$P_{in} = \frac{\exp(\mu(\beta' V_{in}))}{\sum_j^J \exp(\mu(\beta' V_{in}))} \quad (2)$$

Where P_{in} is the probability, that respondent n chooses alternative i $(or\ V_{in} = X_{in})$. To estimate logit and conditional logit models by utilizing maximum likelihood procedure, in this study Nlogit 4.0 (LIMDEP) has been implemented. Linearity in parameters is an assumption for V_{in}.

Individual utility function (systematic component), which is the function of attributes (Caussade *et al*., 2005), can be stated as follows:

$$V_{in} = \beta_1 x_{in} + \beta_2 x_{2in} + \cdots + \beta_k x_{kin} \quad (3)$$

in which x_g is the variable and β_g is the coefficient that are going to be estimated in each survey. Multinominal Logit (MNL) will specify dependent value, when it takes more than two values. The question that its answer according to Bateman *et al*., (2002) in the literature stated as a measure of welfare, Marginal Utility or marginal WTP and also part worth, is how much a respondent is willing to pay in order obtaining one more unit form a particular attribute? The economic valuation methods such as CM estimate this amount. From the choice probability as shown in equation (2), welfare measure can be calculated by estimating the coefficient value of β by maximizing along the log likelihood function over the parameters. Therefore, part worth (or implicit price) is calculated as follows:

$$\text{Partworth} = -\beta_a/\beta_b \quad (4)$$

Where for linear utility, any non-monetary attribute can be subscripted by β_a as a coefficient and coefficient of cost attribute can be identified by β_b. Also, trade-off between two non-monetary attribute coefficients can be determined through partworth ratio for one attribute against the others.

3.2 Sampling Technique and Sample Size

According to Dillman (2007), in the CM survey, there are several survey types, namely, face-to-face interviews; interview by door knocking or attendance at a particular location, drop-off – pick-up, mail survey, phone survey, and internet or web-based survey. Nevertheless, due to the high response rate (Pearce *et al.*, 2002) and high quality of data collection, the face-to-face survey is a recommended mode (Bateman *et al*., 2002) especially in developing countries (FAO, 2000); as has been done in this survey. Choosing a suitable sample size is a balance between precision versus cost (Barnett, 1991; Bateman *et al*., 2002). To achieve visitors' preferences for ecosystem function values in PIMP and more accurate result from the sample, 380 visitors at Perhentian Kecil and Besar were interviewed.

3.3 Pre-test

According the objectives of the study the pre-test is designed by pursuing the steps for designing a choice model questionnaire. The first (initial questions) and second sections concerned with the knowledge of the respondents and the use of PIMP, Section three covers valuation of PIMP followed by the attribute. In order to avoid any language barrier, the questionnaires have been prepared in two languages; namely, English and Malay.

3.4 Pilot test

A pilot test was conducted in June 2012; in order to check some statistics and model fit, also the clarity of questionnaire, and amend ambiguous questions (Arabamiry *et al*., 2013) before starting the actual survey.

4. Results and Discussion

4.1 Sample Response Rate

From total numbers interviewed only 346 were retained. That means response rate in this survey is 92%.

4.2 Attitudinal Information of Respondents

To elicit respondents' preference to conservation attitude and their priority, they were asked in specific question to rank 1 for most important and 4 for the least important mentioned ecological attributes (Table 2).

Table 2: Distribution of respondents' priority regarding conservation of ecological attributes

Definition	Most important: 1	More important: 2	less important: 3	Least important: 4
Conservation of water quality	173(50)	89(25.7)	36(10.4)	48(13.9)
Conservation of coral	124 (35.8)	164(47.4)	38(11)	20(5.8)
Conservation of fish species	31(9)	50(14.5)	181(52.3)	84(24.3)
Conservation of marine turtle	19(5.5)	42(12.1)	91(26.3)	194(56.1)

Note: *Figures in parentheses indicate percentage of N=346 (%)*

However, all elements of an ecosystem are important, and they are connected to each other like rings of a chain. Majority of respondent with highest percentage (50%) stated conservation of water quality is the most important to them. Coral are the nursery of fish species and marine turtle; therefore, coral can be second important element of marine ecosystem. Results indicate highest number of respondents with 47.4%, their priority regarding coral is more important. In addition of recreational value, fish species have also economic values; thus third important element can be fish species which respondents' conservation priority of fish species were 52.3%. This mean, the high percentage of respondents believe after water quality and coral, fish species are in third step for conservation priority. Finally, least importance can be marine turtle. Highest percentage of respondents' priority regarding conservation of marine turtle is 56.1%; that means, it is important to them in least important stage.

4.3 Choice Modelling Results

Extraction of respondents' behavior to respond to the choice sets can be first step in order to identify the model. Except Entrance Fee (EF), it is expected the sign for all variables be positive. This means that PIMP visitors' utility will increase positively with improvement in all ecological attributes. But, based on diminishing marginal utility for one unit additional conservation and improvement in it, they are unwilling to pay more, that this justify the expectation of negative sign of EF variables.

However, the results of the basic model (model 1) indicated that attributes have expected signs, are statistically significant, and respondents' support to increase in marine conservation conclusively can be deduced from these results; but to improvement the fitted and estimated model, there are more accurate approaches; such as including an attributes level model or/and interacting them with socio-economic variables as implemented in upward sections.

4.3.1 Simple Multinomial Logit Model Results

In the choice model for each attribute there are individual levels. In order to make clear sense for each levels' MRS, introducing dummy variable for each level is essential, except continues variable i.e. EF.

Generally, the overall parameters of model (2) are positive and in accordance with a prior expectation; smallest contribution to utility by base level chosen is indicating by these results; i.e. higher positive coefficient for higher levels (e.g. CC2 and CC3) of attributes means that in compare with baseline level or *status quo*, higher level are highly favored for respondents. The overall parameters have higher amount than baseline. Therefore, higher level preferred to baseline (Table 3).

Table 3: Multinomial simple model

Model 2			
Variable	**Coefficient(β)**	**Std. Error**	**P -value**
CC2	0.7801	0.1796	0.0000***
CC3	1.5115	0.1664	0.0000***
MT2	0.5680	0.1936	0.0033***
MT3	0.4858	0.1243	0.0001***
FS2	0.5458	0.1490	0.0003***
FS3	0.7778	0.1254	0.0000***
WQ2	0.9873	0.1222	0.0000***
WQ3	1.3075	0.1113	0.0000***
EF	-0.0254	0.0050	0.0000***
Summary statistics			
Number of Observation	3633		
Log likelihood function	-915.3629		
Log likelihood, No coefficients	-991.5654		
Pseudo R^2	0.07685		
Adjusted Pseudo R^2	0.07341		
Marginal values of EAS attributes			
CC2	30.7122	9.8566	0.0018***
CC3	59.5093	14.2293	0.0000***
MT2	22.3620	8.6508	0.0097***
MT3	19.1261	6.2416	0.0022***
FS2	21.4893	7.3925	0.0037***
FS3	30.6235	7.3346	0.0000***
WQ2	38.8730	8.5614	0.0000***
WQ3	51.4760	9.4145	0.0000***
Wald Statistic = 33.07890			
Prob. From Chi-squared[8] = 0.00006			

Notes: ****, **, * denotes significance at the 99%, 95% and 90% level of confidence respectively*

Furthermore, based on criterions log likelihood ratios which increase from -926.4418 to -915.3629; and pseudo R^2 which increased from 0.0657 to 0.07685; therefore, simple model is better fitted than basic model. Thus, much higher proportion of choice is explained in the expanded model than those are explained in simple generalised model. In accordance with the hypothesis that increasing in conservation charge has negative contribution on utility, it has confirmed with negative sign and significant of coefficient of EF. And hold true for expanded model also. The MRSs, as illustrated in lower part of Table 3, are higher than their similar amount in the basic models (model 1); and in model 2 all were significant at 1% level.

4.3.2 Multinomial Logit Interaction Model

In order to estimate more accurate model of choice and account for heterogeneity of preferences, a simple yet important step is inclusion of socio-economic attributes in the model as suggested by Rolfe, Bennett, and Louviere (2000) and McConnell and Tseng (2000). Inclusion of interaction variables can generate a rich set of data for each level of main attributes. For a given respondent the socio-economic characteristics are the same but for selection option (1, 2, and 3) for each choice question and across several choice sets they vary. Thus, to avoid Hessian singularity socio-economic variables enter in the model with interaction of main attribute variables.

In the first stage of analysis some socio-economic variables were included in the model but most of them were not significant statistically. Finally, except main attributes only significant variables are presented to proceed the analysis. At the earlier stages three interaction models have been specified. From the results could be deduction that positive influence on model fit is the result of inclusion interaction variables in the model. As a result based on statistic indicators, model three has more explanatory power to explain the choice preferences in compare with other models. Because in compare with simple model in Table 3 (model 2) the value of log likelihood ratio has risen from -915.3629 in model two to -889.0317 in model 3.

Furthermore, it hold true for pseudo R^2 statistic (0.10341 for model 3 and in model 2 was equal to 0.07685). Hence, this model has more explanatory power relative to simple model (model two). Overall chi-squared statistic for this model is higher than critical value of it, thus null hypothesis that all coefficients are simultaneously equal to zero is rejected and models is statistically significant at 1% level.

Table 4 indicates that by introducing interactional variables in the interaction model, FS3 and WQ2 of main attributes become insignificant at any level relative to model two; but substantial detail has been generated by linking between respondents' characteristics and choice for Ecological attributes in PIMP.

Table 4: Multinomial Logit Interaction Model

Model 3				
Variable	**Coefficient(β)**	**Std. Error**	**P -value**	**Marginal value**
CC2	0.8114	0.1817	0.0000***	32.5863
CC3	-2.2054	0.9641	0.0222**	-88.5703
MT2	2.0073	0.6592	0.0023***	80.6145
MT3	1.4714	0.4596	0.0014***	59.0924
FS2	1.8442	0.5267	0.0005***	74.0643
FS3	0.3378	0.3523	0.3376	13.5663
WQ2	-2.2829	0.6223	0.6493	-91.6827
WQ3	1.9998	0.3839	0.0000***	80.3133
EF	-0.0249	0.0051	0.0000***	-
CC3_EDU	0.1352	0.0462	0.0035***	5.4297
CC3_GEN	0.3923	0.2820	0.1643	15.7550
CC3_AGE	0.0348	0.0141	0.0134**	1.3976
WQ3_CGM	0.230314D-04	0.744718D-05	0.0020***	0.0092
WQ3_AGE	-0.0285	0.0115	0.0135**	-1.1446
WQ2_EDU	0.0825	0.0398	0.0383**	3.3133
MT3_AGE	-0.0309	0.0138	0.0252**	-1.2410
MT2_AGE	-0.0446	0.0186	0.0165**	-1.7912
FS3_GEN	0.3222	0.2278	0.1572	12.9398
FS2_AGE	-0.0405	0.0151	0.0071***	-1.6265
Summary statistics				
Number of Observation		3633		
Log likelihood function		-889.0317		
Log likelihood, No coefficients		-991.5654		
Pseudo R^2		0.10341		
Adjusted Pseudo R^2		0.09632		

Notes: ****, **, * denotes significance at the 99%, 95% and 90% level of confidence respectively*

5. Conclusion and Recommendation

However, to gain more information and getting enabled to explain the economic values as well accounting heterogeneity of preferences, the level of attributes and interaction with socio-demographic approaches have been followed for analysing of data. But statistically, some of the variables became insignificant in the interaction model (model 3). In conclusion, it seems that the attributes were utilized to estimate MNL simple model statistically can be considered as better fitted models by them. Because, all coefficients were significant with high level and attributes had consistent results explained through choice experimental data analysis. Therefore, the results infer that the visitors of PIMP are aware of the sensitivity of the main marine resources and the respondents' intention to improve its status is in the highest level. Such that, based on this model, the greatest visitors' preference for different attribute levels with RM59.5 was for coral cover improvement from high level (5%) to highest level (10%). As well, the next marginal value was for water quality improvement from high level (5%) to highest level (10%) with RM51.5.

In marine ecosystem arena, Malaysia aspired to be the management leader for marine biodiversity conservation in South East Asia by 2015; as well as, DMPM to achieve the objectives of its Strategic Plan that will be expired by 2015; and every five years the DMPM will review and upgrade its management plan.

Therefore, to achieve the above mentioned intentions the balance between ecotourism and general tourism and marine ecosystem in all marine parks and particularly in PIMP is a critical responsibility of policy makers. Thus, the results of this study as an economic valuation provide invaluable support for conservation efforts in the direction of maintenance biodiversity. Moreover, based on the findings of this study, it is useful to assists the policy maker and other stakeholders to apply the profile of respondents and their perceptions, in their future plans regarding the management and development of recreational activities in Marine Park sites in Malaysia even in South East Asia.

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