

# Activity and Support Factors Influencing Increased Value Of Invertebrates In Ecotourism

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**Abstract**—Invertebrates form an estimated 73.5% of life on Earth and mostly they are often considered to be crucial component of biodiversity in terms of diversity and role in ecosystem functioning. Conservation measures for invertebrates are largely inadequate and this can be improved in the content of ecotourism. Analyzing the factors that influence visitor satisfaction is critical for appropriate management of tourism particularly in nature tourism. This paper investigate the overview of response of tourist to the concept of focused-invertebrates activity, to obtain the level of tourist's support to the focused-invertebrates activity and to assign an advocacy on how to embark on the lack of invertebrates information in ecotourism. Implications for management are discussed in terms of the potential of inclusion of invertebrate's information in ecotourism.

**Keywords**—ecotourism, conservation, activity, support

## I. INTRODUCTION

ECOTOURISM constitutes a small but rapid growing of the world's tourism (Schulte, 2003; TIES, 2006). Henceforth, it is close relation to nature, ecotourism has the potential to become a vital of conservation and to sustain long-term preservation of Natural Protected Areas (NPAs) and their biodiversity (Alcorn, 1993; Gossling, 1999; Kruger, 2005; Stronza, 2000). Globally, the inclusion of invertebrates in ecotourism activity is exceptional. Where invertebrates-focused activities do take place it is inevitably to view a spectacular phenomenon created by a large collection of one type of insects (Huntly *et al.*, 2005). The majority of organism in the Kingdom of Animalia in terms of both abundance and species are invertebrates. Invertebrates only forming about 73.5% of living thing on earth (Hammond, 1995) and are often considered to be the most significant component of biodiversity in terms of their diversity role in ecosystem functioning (Horwitz *et al.*, 1999) Scientist have calculated that approximately 30,000 species of plants and animals are lost every year due to human activities, and most of these losses are invertebrates (Eldredge, 1998). Negative

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perceptions of invertebrates contribute to the inadequacy of their conservation. Many people in developed first world countries view invertebrates, especially insects, with disgust, focusing them to be dangerous, poisonous or carriers of disease (Horwitz *et al.*, 1999). To maximize the potential of ecotourism as a useful tool for nature conservation, it is crucial to know the level of activity and support factors that influence increased value of invertebrates in ecotourism. This study aimed to investigate the Activity and Support factors influencing increased value of invertebrates in ecotourism. The objective of the research were to evaluate the overview of response of tourist to the concept of focused-invertebrates activity, to obtain the level of tourist's support to the focused-invertebrates activity and to assign an advocacy on how to embark on the lack of invertebrates information in ecotourism.

## II. PROCEDURE

To attain the objectives, two main methods were used, namely structured and standardized questionnaire that will be design according to the research objectives and observations based on tour guides interpretation during tourist's activities (guide tour). The two methods were chosen to ensure that the following information were that crucial for the research can be obtained. The information includes:

### A. Attitudes of tourist to the inclusion of invertebrates in ecotourism activities

A structured, standardized questionnaire were used to assess the response of tourists to: (i) the integration of invertebrate-focused tourism into current tourism activities; (ii) ecotourism activities focusing almost entirely on invertebrates and (iii) inclusion of indigenous knowledge on invertebrates

### B. Assessment of extent of invertebrate inclusion in existing activities

Data were collected by participating in: a guided night drive, a guided walk and guided wilderness trail at the Tabin Wildlife Reserve. Observations were made regarding the type of information guides gave to tourists, noting in any particular any information on invertebrates.

## III. RESULT AND DISCUSSION

For demographic data, statistical analysis showed that there

were 170 respondents participated in total, whereby male came in the highest number of group, 60.6% and female only has 39.4%. Furthermore, 80.6% of the respondents were Tourists, Operator (12.4%) and Student (4.1%), followed by Tour Guide (2.4%) and Researcher (0.6%). Country from Malaysia showed the highest number of respondent (19.4%), followed by Netherland (17.6%), China (16.5%), German and Italy (9.4%), Denmark (7.1%), Canada (5.3%), U.S.A and France (4.7%), Japan (3.5%) and Singapore (2.4%). Regarding the age range, 25.9 % of respondents were aged within 43 and above, 23.5% aged within 33-37, 18.2% aged within 38-42, 13.5% aged within 28-32, 12.9% aged within 23-27 and the lowest range age within 18-22 (5.9%). Respondent's education background majority were Bachelor Degree holder (52.9%), Diploma holder (18.8%), followed by High school/Matriculation (12.9%), Master Degree holder (11.2%) and the lowest was Vocational (4.1%).

#### A. Structural Equation Modeling

Structural Equation Modeling (SEM) technique utilizing Analysis of Moment Structure (AMOS) computer programme version 21 was carried out with the aims to examine the strength of the relationships between latent variables and observed variable as posited in the research hypotheses and the conceptual framework for simultaneous test that chains multiple regressions with confirmatory factor analysis to estimate simultaneously a series interrelated dependence relationships. The SEM analysis is performed through two phases: measurement model and structural model. Measurement model comprises 2 components: Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Details as described as follows.

##### Measurement Model – Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) is executed via Statistical Package for Social Sciences (SPSS) computer programme version 20 with the aims for data reduction of items that is below the recommended value of 0.50 to well represent its expected factor for further analysis. Results as presented in Table 1 details the items loadings, beside the Cronbach's Alpha values for all factor, i.e. Activities, Supports, and Ecotourism. It is noted that the loading items greater than 0.50, and Cronbach's Alpha value exceed 0.70 to consider the items load heavily to its respective factor and reliable for subsequent level of analysis (Hair *et al.*, 2010). All factor investigated in this study were designed in five question items. During the EFA, all items are reliable to measure its respective factor as it fulfilled the requirements of having loadings above 0.50 with no cross-loadings. Indeed, all constructs have Cronbach's Alpha values beyond 0.70 i.e. Support (0.873), followed by Ecotourism (0.860), and Activities (0.815), respectively. Henceforth, all factors had high internal consistency.

Table 1: Items Loadings

Construct	Items	Standardised Loading	Cronbach's Alpha
Activities	D1	0.798	0.815
	D2	0.813	
	D3	0.819	
	D4	0.781	
	D5	0.645	
Supports	Es1	0.864	0.873
	Es2	0.794	
	Es3	0.905	
	Es4	0.777	
	Es5	0.724	
Ecotourism	F1	0.794	0.860
	F2	0.855	
	F3	0.788	
	F4	0.845	
	F5	0.748	

##### Measurement Model – Confirmatory Factor Analysis

After each items load heavily to its respective factor in the EFA stage, Confirmatory Factor Analysis (CFA) utilizing Structural Equation Modelling (SEM) technique via Analysis of Moment Structure (AMOS) computer programme version 21 was performed to test the measurement model whether has a satisfactory level of validity and reliability before testing for a significant relationship in the structural model. It was performed with the aims to test the validity and reliability of each construct before testing for a significant relationship in structural model, including Standardised Item Loadings, Construct Reliability, and Average Variance Extracted (AVE). It is a requirement that any item that does not fit the measurement model due low Standardised Item Loadings (i.e. loadings <0.70) need to be removed from further analysis (Fornell & Larcker, 1981; Ifinedo, 2006). Furthermore, the Composite Reliability value for each factor must exceed 0.70, and Average Variance Extracted (AVE) must surpass 0.50 to have acceptable results (Hair *et al.*, 2010). Table 2 depicts the reliabilities and validities for each factor, including Standardised Loadings for each item, Construct Reliability and Average Variance Extracted (AVE).

Table 2 details that the Standardised Loadings for each item, Construct Reliability and Average Variance Extracted (AVE), fulfilled the minimum requirements stated above. Before that, there is an item is discarded for Support factor, while 2 items each are eliminated for Activities factor to improve the model fit. Next, the Cronbach's Alpha value for this model shows that Support has the highest Cronbach's Alpha value (0.870), followed by Ecotourism (0.860), and Activities (0.807), respectively.

**Table 2: Items Reliabilities and Validities**

Construct	Items	Standardised Loading	Cronbach's Alpha	Composite Reliability	Average Variance Extracted
Activities	D1	0.584	0.807	0.871	0.701
	D2	0.915			
	D3	0.926			
Supports	Es1	0.875	0.870	0.873	0.636
	Es2	0.692			
	Es3	0.919			
	Es4	0.674			
Ecotourism	F1	0.749	0.860	0.849	0.534
	F2	0.763			
	F3	0.779			
	F4	0.799			
	F5	0.529			

For Composite Reliability (CR), Support had the highest value (0.873), followed by Activities (0.871) and Ecotourism (0.849). Next, the Average Variance Extracted (AVE) revealed that Activities came the highest (0.701), followed by Support (0.636) and Ecotourism (0.534). All variables showed high value than the threshold, this indicating good convergent validity.

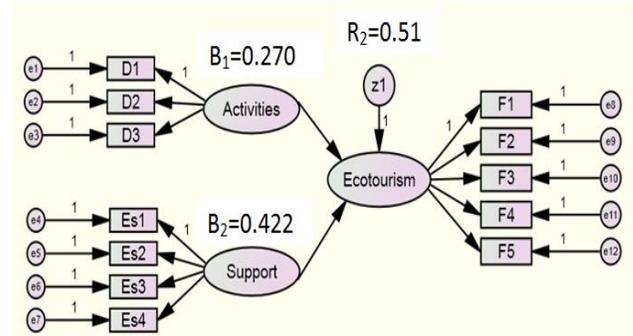
**B. STRUCTURAL MODEL**

The structural model in SEM was evaluated by examining several fit indices, besides examined the strength of the relationships between independent variables and dependent variables simultaneously. Table 3 presents the results of the overall goodness-of-fit indices for the structural model. To have best fit value, fit indices value for CFI, GFI and NFI must above 0.90 and RMSEA below 0.80 (Bentler, 1990; Byrne, 2001). Results specified that the  $\chi^2$  of the model was 218.909 with 105 degrees of freedom. The fit indices value of  $\chi^2/df=2.085$  and RMSEA of 0.080. Values of PNFI and PCFI were 0.613 and 0.645 respectively, which were exceeded 0.50. In addition, the fit indices value for CFI = 0.940 (>0.90), and GFI = 0.885 (>0.80), specifying that all indices surpassed the respective common acceptance levels that was suggested by previous research (Bentler, 1990; Byrne, 2001). Hence, the structural model has a satisfactory model fit.

**Table 3 : Goodness-of-fit Indices for Structural Model**

	$\chi^2$	df	$\chi^2/df$	CFI	GFI	NFI	RMSEA	PNFI	PCFI
<b>Recommended Value</b>	N/A	N/A	< 3.0	> 0.9	> 0.9	> 0.9	< 0.08	> 0.5	> 0.5
<b>Model Values</b>	218.909	105	2.085	0.940	0.885	0.894	0.080	0.613	0.645

Figure 1 displays the structural model which examines the relationships between independent variables (i.e. Activities, and Supports) on the dependent variable (i.e. Ecotourism). Specifically, the SEM analysis revealed that 51% variance of ecotourism is well explained by all the two independent variables (i.e. Activities, and Supports).



**Figure 1: Result of Structural Model**

The ensuing hypothesis, H1 proposed that Activities have significant positive relationship with ecotourism. Results as presented in Table 4 indicates that H1 is maintained as Activities significantly and positively affect ecotourism ( $\beta_3=0.270$ ,  $p<0.05$ ). Likewise, ecotourism is also influenced by Support factor ( $\beta_4=0.422$ ,  $p<0.05$ ). SEM confirmed that this factor had highest standardized beta coefficients, implying it is the most imperative factor influencing ecotourism. Hence, H2 is sustained.

**Table 4 : Relationships on Ecotourism**

Paths	Estimate	S.E	C.R	p
<b>H1</b> Activities --- > Ecotourism	0.270	0.090	2.595	0.009*
<b>H2</b> Support --- > Ecotourism	0.422	0.061	4.152	0.000*

\* $p<0.05$

Discriminant Validity examines the extent to which a construct is truly distinct from other constructs tested (Hair *et al.*, 2010), by comparing the value of Average Variance Extracted (AVE) value with correlation squared (Fornell & Larcker, 1981). Table 5 specifies the correlation matrix for constructs where there is a significant positive correlation between all variables at 0.01 level. For instance, Support highly correlated with Ecotourism ( $r=0.574$ ,  $p<0.01$ ) meanwhile Activities ( $r=0.432$ ,  $p<0.01$ ). Hence, there is no multicollinearity problem in this research. For the skewness, it ranges between -0.861 to -0.204, which is below  $\pm 2.0$ , while Kurtosis ranges between -0.745 to 1.090, lower than  $\pm 10$ . Both results lead the model to be in a normal distribution or Bell-shaped curve. Next, means for all factor range between 3.950 to 4.262 on a scale of 1=strongly disagree to 5=strongly agree, inferring respondents mostly had positive attitude toward ecotourism.

Table 5: Correlation Analysis

	ACTIVITY	SUPPORT	ECOTOURISM
ACTIVITY	0.837		
SUPPORT	0.402**	0.797	
ECOTOURISM	0.432**	0.574**	0.731
MEAN	4.121	3.950	4.262
STD DEVIATION	0.621	0.730	0.583
SKEWNESS	-0.204	-0.345	-0.861
KURTOSIS	-0.734	-0.745	1.090

\*\* Correlation is significant at the 0.01 level (2-tailed).

#### IV. CONCLUSION

This paper proposes that a cost-effective and efficient means of raising awareness of invertebrates should be included in existing and future ecotourism activities. In the process some form of value will be applied to them. The inclusion of invertebrates in ecotourism services and products would also enhance the quality of the conservation measurement, tourism industry and henceforth their competitiveness.

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