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Research Article

Tourists Perspective: Inclusion of Entotourism Concept in Ecotourism Activity

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Abstract
This research was primarily conducted in Tabin Wildlife Reserve, Lahad Datu, Sabah, with the aim to determine the response of tourists to the concept of including invertebrate information in current and planned ecotourism activities in order to increase conservation efforts involving invertebrates. A questionnaire survey was distributed during the preliminary entotourism activity in order to test the conceptual framework set posited in this research. The development of the conceptual framework in this study detailed the model of network of relationship among the variables that needed to be scrutinized. Data collected was analysed using Statistical Package for Social Sciences (SPSS) and Analysis of Moment Structure (AMOS) software programme which uses the Structural Equation Modelling (SEM). SEM analysis revealed a significant variance of *Ecotourism* that was well explained by all four exogenous variables (*Activity, Information, Interest* and *Willingness*). The findings of this study aspire to contribute to the literature of invertebrate species conservation awareness in Sabah, since very limited research is conducted specifically on the entotourism field.

Keywords: Invertebrates, Entotourism, Conservation, SEM, AMOS

Introduction

Invertebrates Threatened

Invertebrate conservation is hard to justify when many people see each insect as a potential pest or each spider as a potential health threat. Public are often unaware of invertebrate roles in ecosystems as well as conservation threats that they face. Lacking such information, people are tend to disregard importance of invertebrates for the functioning of ecosystem or their need to be protected (Martín-López, Montes, & Benayas, 2007). Indeed, public support is fundamental in reducing current extinction rates (Ladle & Jepson, 2008).

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Invertebrates form about 73.5 % of organisms on earth (Hammond, 1995) and are often described to be the pervasive component of biodiversity in terms of their diverse role in ecosystem functions (Horwitz, Recher & Majer, 1999). Scientists detail 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 perceptions of invertebrates contribute to the inadequacy of their conservation. Most people in developed first world countries view invertebrates, especially insects, with disgust, emphasising them to be dangerous, poisonous or carriers of disease (Horwitz et al., 1999). MacKinney (1999) presumed that at least a quarter of all insects are faced with extinction as a direct result of landscape transformation and habitat loss because of competition with humans for space and resources. Without a large scaling up of taxonomic efforts in most of these cases, the species will unknowingly go extinct.

Some may question why we should care if a few more species of invertebrates go extinct. Humans are the primary cause of modern extinctions and because of the intrinsic value of species; we are morally obliged to avert human mediated extinction (Sagoff, 2009). Secondly, invertebrates have instrumental values via the use of organisms for human benefits and this often give us with the best reason for justifying conservation actions (Justus, Colyvan, Regan & Maguire, 2009). The role that they play in ecosystem functions may provide us with a wide range of benefits; compared to if the ecosystem function is compromised through the loss of species and incurs high economic costs to humans (Losey & Vaughan, 2006).

Ecotourism Benefits

Weaver (2008) defined ecotourism as sustainable tourism that contributes actively to the conservation of natural and cultural heritage. This includes local and indigenous communities in planning, development and operation as well as their well-being. It is widely known that the sustainability criterion of ecotourism includes economic and sociocultural dimensions, and at the same time, it serves to minimise ecological costs and maximise ecological benefits (Weaver, 2008). Kiss (2004) reported that an ecotourism project in Peru during early 2000s yielded a mean annual household income of about US$735. Similarly, 20 % of the US$181,000 in commercial expenditure was generated by eco-tourists in the Apo Island Marine Sanctuary in the Philippines in 1999 and this went directly to local residents (Cadiz & Calumpong, 2002). Ecotourism revenue and employment foster community stability and wellbeing, especially if these are accompanied by a high degree of local control. This also provides

indirect social benefits through enjoyment experienced by local residents and visitors (Weaver & Lawton, 2002).

Ecotourism in Conservation

It is commonly suggested by tourism industry associations and government tourism agencies that the outdoor tourism industry should contribute to conservation merely by exposing their clients to the wonders of the natural world (Guclu & Karahan, 2004). The clearest way in which tourism can contribute to conservation is through funding the establishment and operation of private conservation reserves (Buckley, 2003). A number of ecotourism and cultural tourism operators are also making direct cash donations to particular conservation or community causes, funds, organizations or trusts (Beunen, Regnerus & Jaarsma, 2008). Some eco-tour operators support NGOs that lobby for conservation by providing free transport and accommodation for researchers, while for conservation groups, they usually bringing politicians to inspect current or potential conservation areas (Buckley, 2006).

Invertebrates in Ecotourism

People are now becoming more interested in nature. This type of ideology suggests there is potential for the inclusion of a focus on invertebrates in ecotourism activities. The main benefit of incorporating invertebrates into ecotourism activities would be to raise awareness of the crucial role played by invertebrates (Huntly, Noort & Hamer, 2005). For example, in Mexico there are tours offered to see the spectacles of the annual migration of millions of Monarch Butterflies (Huntly, Noort & Hamer, 2005). In Australia, glow worm tourism has been become as a multi-million dollar industry, while, in New Zealand, Waitomo Caves attracts on average more than 400,000 tourist visitors annually and in summer, visitor numbers rise to approximately 2,000 people per day (Baker, 2003). This attraction to invertebrates would perhaps contribute to their conservation and improve tourism services as well as introduce new tourism products. The benefits from this include increasing awareness of invertebrates which will result in support for their conservation as well as improved products and services offered by ecotourism operators, especially those in areas which do not have the Big Five (Huntly et al., 2005).

Research Opportunity

The substantial literature which underpins this study has revealed the use of tourism, specifically ecotourism as a conservation tool to increase invertebrates conservation measures and to encourage public awareness on crucial roles that invertebrates play in a functioning ecosystem. Literature has

shown ignorance about invertebrates in conservation programmes and their need to be protected since their population has degraded extremely over many years both knowingly and unknowingly. Specifically, this study aims to determine the response of tourists to the concept of including invertebrate information in current and planned ecotourism activities at Tabin Wildlife Resort in Tabin Wildlife Reserve, Lahad Datu, Sabah, Malaysia. This study also urges a cost-effective and efficient means of raising awareness of invertebrates conservation efforts and its ecological importance that should be included in existing and future ecotourism activities. Indeed, this research was conjectured to have a significant relationship between nature-based activities focused on invertebrates (entotourism) in increasing the value of invertebrate conservation.

Research Methodology

Research location

This research was specifically conducted in Tabin Wildlife Resort, at Tabin Wildlife Reserve, Lahad Datu, Sabah. Tabin Wildlife Reserve is located in the eastern part of Sabah, Malaysia on the island of Borneo (Figure 1). This reserve is a rectangular area approximately 300,000 acres in the centre of the Dent Peninsula, north-east of Lahad Datu town which is near the south of the lower reaches of the Segama River and north of the Silabukan Forest Reserve.

Research design and approach

A quantitative research approach was adapted to examine the research objective theories by scrutinising the relationship among variables in the conceptual framework (Figure 2). This approach was chosen based on the post-positivism paradigm that reflected the need to identify and assess the causes that influenced the outcomes of research and reduced the ideas into a small distinct set. One set of questionnaire survey with Likert Scale structure was produced.

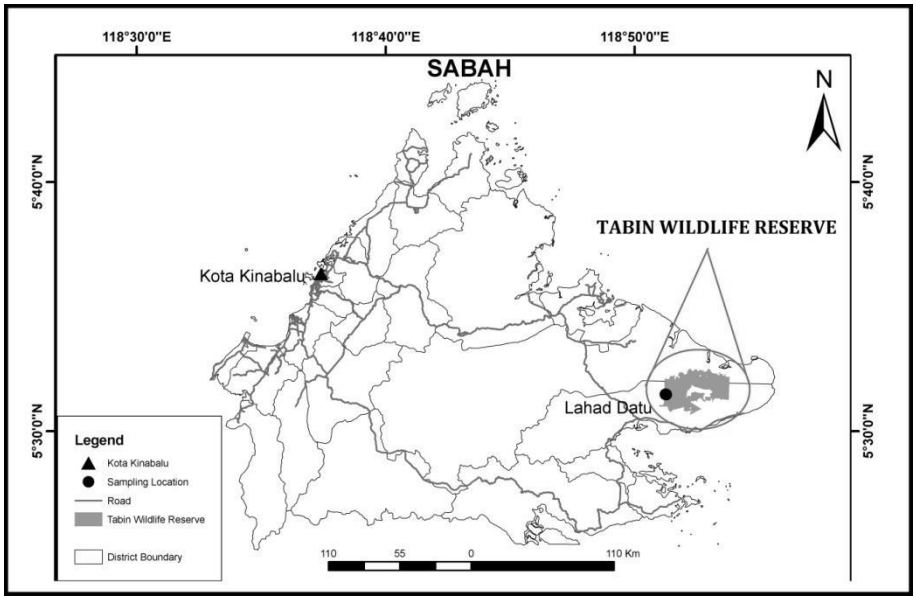

Figure 1. Map of Tabin Wildlife Reserve, Lahad Datu, Sabah.
Source: Biodiversity Monitoring Lab of Institute for Tropical Biology and Conservation

Systematic sampling was executed in this study, mainly targeting tourists who visited Tabin Wildlife Resort and who have participated in the preliminary entotourism course. The sample size of this study followed the recommendation of sample size by Hair, Black, Rabin & Anderson (2010) in which the minimum sample required is 100 samples for five or less latent constructs and each latent construct has more than three items, in order to analyse the data in Structural Equation Modelling utilising Analysis of Moment Structure (AMOS).

Figure 2 displays the conceptual framework of the survey that comprised five variables and hypotheses simultaneously (H1 to H4: exogenous variables and H5: endogenous variable). These variables dimension were built based on literature background of invertebrate conservation through ecotourism activities that were specifically reviewed in this study, so that the variables could be modelled into the conceptual framework.

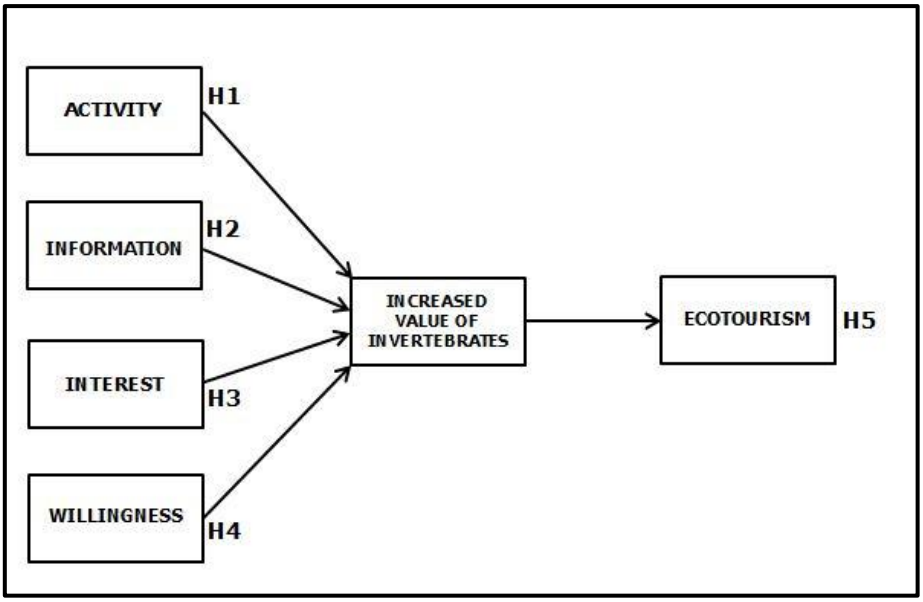

Figure 2. Model of Conceptual Framework

H1: *Activity in ento-trail significantly affects the increased value of invertebrates*
H2: *Information given in ento-trail significantly affects the increased value ofinvertebrates*
H3: *Interest on ento-trail significantly affects the increased value of invertebrates*
H4: *Willingness on ento-trail significantly affects the increased value of invertebrates*
H5: *Tourist's perception on invertebrates in ento-trail significantly affects the ecotourism industry*

Preliminary entotourism course and questionnaire survey

Structured and standardized questionnaire surveys were executed to evaluate the response of tourists towards the inclusion of invertebrate tourism into current tourism activities. A preliminary entotourism course which fully focused on invertebrate information was conducted in the early morning from 6.00 am to 8.00 am at the Gibbon trail and river trail that run 1.0 KM in length. These trails were chosen for the preliminary course of entotourism activity due to the high number of invertebrates that can be easily seen and heard. The questionnaire survey was distributed after the session on entotourism guided walk was over. A list of invertebrates was recorded along the trails before the course.

Data analysis

Quantitative data was collected via the questionnaire survey and analysed using Statistical Package for Social Sciences (SPSS) and Analysis of Moment Structure (AMOS) computer programme. Structural Equation Modelling or SEM using the Analysis of Moment Structure (AMOS) computer programme was executed with the aim to examine the strength of relationships between endogenous variables and exogenous variables as posited in the research hypotheses and conceptual framework.

Results

Demographic data

Demographic data analysis of this study was executed via Statistical Package for Social Sciences (SPSS) version 20.0 with the aim to figure out the trends of data distribution of respondents. There were185 respondents of whom 51.4 % were female and 48.6 % male. All respondents were tourists. Table 1 enumerates the percentage of age range and education background. Based on the age range, the 33-37 years old group was the highest age range at 33.5 % followed by 38-42 (20.5 %), 23-27 (19.5 %) and 43 and above (11.9 %). The 28-32 and 18-22 ranges had the lowest percentage at 9.7 % and 4.9 % respectively. Meanwhile, 62.7 % of respondents graduated with a bachelor's degree, 20.5 % with master's degree and 13.5 % had attended high school. Doctoral degree was the lowest group with only 3.2 % participation. Respondents' nationality in this survey was comprised of many countries as displayed in Figure 3 Japan is the highest participating country with 22.7 % followed by Germany 22.2 % and Netherlands 13.0 %. Malaysia and France shared the same percentages (9.7 %), while 6.5 % participants were from China, Italy and United Kingdom. United States of America was the lowest rate with only 3.2 %.

Structural Equation Modelling (SEM)

Structural Equation Modelling (SEM) technique using the Analysis of Moment Structure (AMOS) computer programme version 21.0 was carried out with the aim to examine the strength of relationships between latent variables and observed variables 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 of interrelated dependence relationships. The SEM analysis was performed through two phases: measurement model and structural model.

Table 1. Demographic data for age range and education background

Aspects	Frequency	Percentage (%)
Age		
33-37	62	33.5
38-42	38	20.5
23-27	36	19.5
43 and above	22	11.9
28-32	18	9.7
18-22	9	4.9
Education Background		
Bachelor Degree	116	62.7
Master Degree	38	20.5
High school/Matriculation	25	13.5
Doctoral Degree	6	3.2

Measurement model

Measurement model consists of two components, namely, Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Exploratory Factor Analysis (EFA) was executed via Statistical Package for Social Sciences (SPSS) version 20.0 with the aim of data reduction of items that was below the recommended value of 0.50 to well represent its expected factor for further analysis.

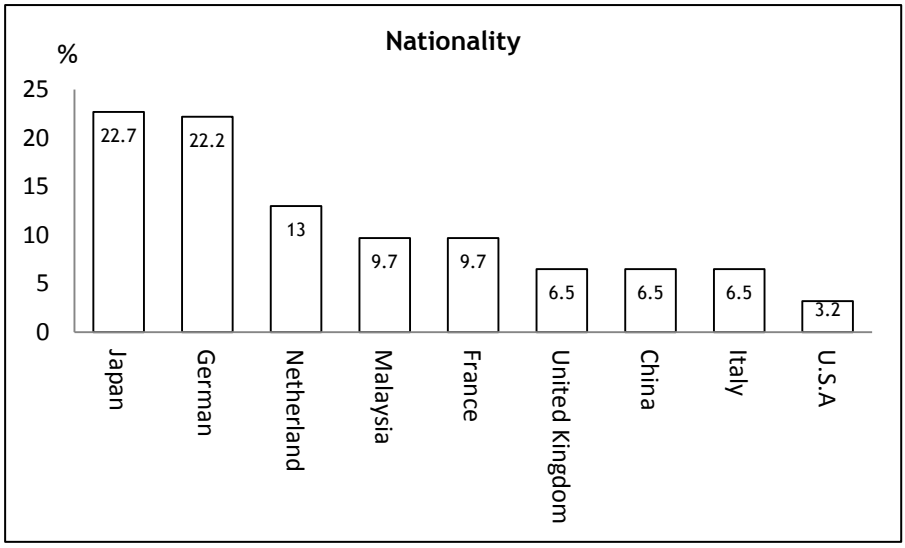

Figure 3. Bar chart of respondent's percentages based on the nationality

Exploratory Factor Analysis (EFA)

Results as presented in Table 2 details the items loadings and Cronbach's Alpha values for all factors (*Activity, Information, Interest, Willingness* and *Ecotourism*). It is acclaimed that the loading items are greater than 0.50 and Cronbach's Alpha value exceeded 0.70 to acknowledge the items load heavily to its respective factor and reliable for subsequent level of analysis (Hair et al., 2010). All factors scrutinized in this study were designed in five question items. In the EFA, all items were reliable to measure its respective factor as it fulfilled the requirements of having loadings above 0.50 with no cross-loadings. However, *Information* eliminated two items and *Ecotourism* and *Interest* eliminated one item for having loadings below 0.50. Indeed, all constructs have Cronbach's Alpha values beyond and approaching to 0.70 with *Activity* (0.754) followed by *Ecotourism* (0.730), *Willingness* (0.693) and *Interest* (0.674) respectively. *Information* was the lowest value of Cronbach's Alpha (0.660). Henceforth, all factors had high internal consistency.

Confirmatory Factor Analysis (CFA)

After each item loaded heavily to its respective factor in the Exploratory Factor Analysis stage, Confirmatory Factor Analysis (CFA) utilizing Structural Equation Modeling (SEM) technique via Analysis of Moment Structure (AMOS) computer programme version 21.0 was performed to test whether the measurement model in the conceptual framework has a satisfactory level of validity and reliability of each construct before testing for a significant relationship in the structural model that included the standardised item loadings, Composite Reliability (CR) and Average Variance Extracted (AVE). It is a requirement (loading >0.70) that any item that did not fit the measurement model due to low standardised item loadings had to be removed from further analysis (Fornell & Larcker, 1981; Ifinedo, 2006). Furthermore, the Composite Reliability (CR) 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 3 arrays the Standardised Item Loadings, Composite Reliability (CR) and Average Variance Extracted (AVE) for each factor. Factors such as *Information*, *Interest* and *Willingness* were needed to eliminate two items resulting in three items left for each variable.

Table 2. Exploratory Factor Analysis

Construct	Items	Standardized Loading	Cronbach's Alpha
	ACT1	0.720	
	ACT2	0.697	
Activity	ACT3	0.682	0.754
	ACT4	0.719	
	ACT5	0.754	
	INFO2	0.715	
Information	INFO3	0.663	0.660
	INFO5	0.799	
	INT1	0.659	
Interest	INT2	0.714	0.674
	INT4	0.672	
	INT5	0.723	
	WILL1	0.557	
	WILL2	0.718	
Willingness	WILL3	0.674	0.693
	WILL4	0.780	
	WILL5	0.609	
	ECO1	0.808	
Ecotourism	ECO2	0.795	0.730
	ECO3	0.704	
	ECO4	0.679	

Further, an item was eliminated in *Activity* and *Ecotourism* to fit the model. Next, Cronbach's Alpha was checked to test internal consistency of the factor items where the results revealed that Cronbach's Alpha values in this study were acceptable and below the recommended value of 0.70 (Hair et al., 2010). Among the five factors, *Willingness* had the highest Cronbach's Alpha value (0.797), followed by *Information* (0.760), *Ecotourism* (0.730), *Activity* (0.713), and *Interest* (0.641). For Composite Reliability (CR), *Ecotourism* had the highest value (0.905), followed by *Willingness* (0.845), *Activity* (0.821), *Interest* (0.815) and *Information* (0.786). Thus, the internal consistency was well handled.

Next, convergent validity was evaluated based on the Average Variance Extracted (AVE) of each factor whereby the value must surpass 0.50 to be considered as satisfactory. Results discovered that *Ecotourism* had the highest AVE values (0.711), followed by *Willingness* (0.645), *Interest* (0.595), *Information* (0.551), and *Activity* (0.535). All variables showed higher value than the threshold value, indicating the measurement model has a good convergent validity.

Table 3. Items reliability and validity

Construct	Items	Standardised Loading	Cronbach's Alpha	Composite Reliability[a]	Average Variance Extracted[b]
Activity	ACT1	0.719	0.713	0.822	0.536
	ACT2	0.756			
	ACT4	0.702			
	ACT5	0.748			
Information	INFO2	0.706	0.760	0.786	0.551
	INFO3	0.733			
	INFO5	0.786			
Interest	INT1	0.727	0.641	0.815	0.595
	INT2	0.811			
	INT5	0.773			
Willingness	WILL1	0.855	0.797	0.845	0.645
	WILL2	0.762			
	WILL3	0.790			
Ecotourism	ECO1	1.072	0.730	0.905	0.711
	ECO2	0.724			
	ECO3	0.768			
	ECO4	0.762			

[a] Composite Reliability = (square of the summation of the factor loadings)/ {(square of the summation of the factor loadings) + (square of the summation of the error variances)}.
[b] Average Variance Extracted = (summation of the square of the factor loadings)/ {(summation of the square of the factor loadings) + (summation of the error variances)}.

Correlation analysis

Discriminant Validity examined the extent to which a construct was 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). The shared variances between factors as shown in Table 4 were beneath the square root of the AVE of the individual factors, endorsing discriminant validity. Further assessment in the correlation matrix of the constructs resulted in significant positive correlations between all variables at 0.01 levels. For instance, *Interest* highly correlated with *Ecotourism* ($r=0.560$, $p<0.01$), followed by *Information* ($r=0.532$, $p<0.01$) and *Willingness* ($r=0.456$, $p<0.01$). Indeed, *Activity* ($r=0.443$, $p<0.01$) also significantly correlated with *Ecotourism*. Hence, there is no multi-collinearity problem in this research. The Skewness was ranged between -0.616 to 0.033, which was below ±2.0, while Kurtosis ranged between -0.939 to 1.066, lower than ± 10. Both results edged the model to be in a normal distribution or Bell-shaped curve. Next, means for all factors ranged between 3.941 to 4.118 on a

scale of 1=strongly disagree to 5=strongly agree, inferring respondents mostly had positive attitude toward ecotourism.

Table 4. Correlation analysis

	Activity	Information	Interest	Willingness	Ecotourism
Activity	**0.731**				
Information	0.528**	**0.742**			
Interest	0.589**	0.628**	**0.771**		
Willingness	0.764**	0.571**	0.585**	**0.803**	
Ecotourism	0.443**	0.532**	0.560**	0.456**	**0.843**
Mean	3.953	4.076	4.180	3.941	4.118
Std Deviation	0.514	0.499	0.452	0.541	0.445
Skewness	-0.068	-0.129	0.033	-0.616	-0.198
Kurtosis	-0.939	-0.187	-0.267	1.066	0.499

** Correlation is significant at the 0.01 level (2-tailed).
Diagonal elements shown in bold are the square root of the Average Variance Extracted (AVE).

Structural model

The structural model in SEM was evaluated by examining (1) several fit indices and (2) the strength of the relationships between independent variables and dependent variables simultaneously.

To have best fit value, fit indices value for CFI, GFI and NFI must be above 0.90 and RMSEA below 0.80 (Bentler, 1990; Byrne, 2001). Table 5 itemises the results of the overall Goodness-of-Fit Indices for the structural model. In this study, the x2 of the model was 66.691 with 42 degrees of freedom. The fit indices value of x2/df=1.588 and Root Mean Square of Error Approximation (RMSEA) was 0.057. Values of Parsimony Normed Fit Index (PNFI) and Parsimony Comparative Fit Index (PCFI) were 0.508 and 0.526 respectively, which exceeded 0.50. In addition, the fit indices value for Comparative Fit Index (CFI) = 0.978 (>0.90), and GFI = 0.953 (>0.90), evidence that all indices surpassed the respective common acceptance levels. Hence, the structural model had a satisfactory model fit.

Table 5. Goodness-of-fit indices for structural model

	X^2	df	X^2/df	CFI	GFI	NFI	RMSEA	PNFI	PCFI
Recommended Value	N/A	N/A	<3.0	>0.9	>0.9	>0.9	<0.08	>0.5	>0.5
Model Values	66.691	42	1.588	0.978	0.953	0.944	0.057	0.508	0.526

Figure 4 displays the framework of the structural model which appraised the relationships between exogenous variables (*Activity, Information, Interest*, and *Willingness*) on the endogenous variable (*Ecotourism*). Specifically, the Structural Equation Modelling analysis divulged that 65% variance of Ecotourism was well expounded by all four exogenous variables.

Table 6 enumerates the relationship of exogenous variables (*Activity, Information, Interest and Willingness*) towards endogenous variables (*Ecotourism*). *Activity* had significant relationship with *Ecotourism,* β1=-0.258, p=0.005 (p<0.05), signifying H1 was sustained. Instead, *Information* displayed insignificant effect on *Ecotourism* with β2=0.575, p=0.062 (p>0.05). Thus, H2 was rejected. The same phenomenon appeared in *Interest* (β3=0.498, p=0.173, p>0.05). Likewise, H3 was also not maintained. The final factor, *Willingness*, has no relationship with *Ecotourism* (β4=-0.172), exemplifying that H4 also disqualified with insignificant p-value (p=0.126, p>0.05).

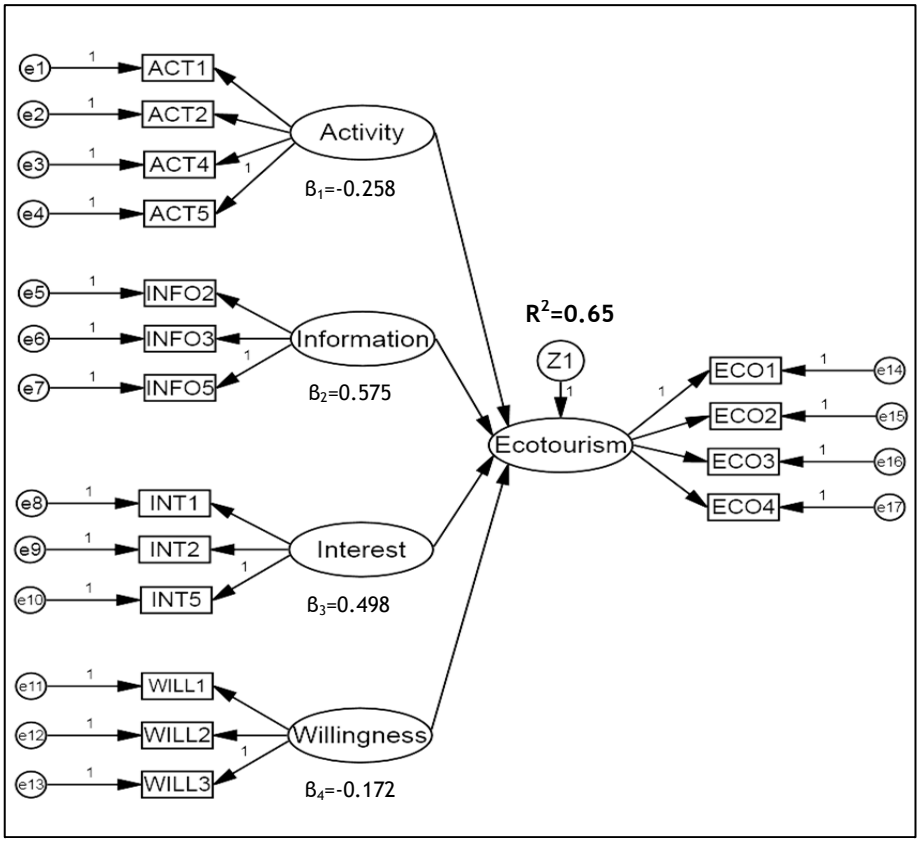

Figure 4. Structural model framework

Table 6. Relationship on ecotourism

	Paths		Estimate	S.E	C.R	*P*
H1	Activity	--- > Ecotourism	-0.258	0.083	-2.837	0.005*
H2	Information	--- > Ecotourism	0.575	0.351	1.864	0.062
H3	Interest	--- > Ecotourism	0.498	0.090	2.595	0.173
H4	Willingness	--- > Ecotourism	-0.172	0.061	4.152	0.126

*p<0.05

Discussion

This survey was executed with five variables of which four variables (*Activity, Information, Interest,* and *Willingness*) were exogenous variables and one (*Ecotourism*) was an endogenous variable.

Interest

Interest variable showed insignificant value in influencing the *Ecotourism* variable in this survey. This trend implied that tourists did not show strong interest towards invertebrates, and instead, most tourists were concerned about big mammals in Tabin Wildlife Reserve such as Pygmy elephants and Orang Utans, apart from f bird watching. However, the interest of tourists slightly increased after they participated in the guided walk course focusing on inclusion of invertebrate information or preliminary entotourism activity. This might be caused by the tourists' realisation on attractiveness of invertebrates and significance to include such information in ecotourism activities. Lemelin (2009) stated that invertebrates have gained much interest and is also able to attract people in many ways. Even though the *Interest* factor did not significantly affect *Ecotourism*, it still showed some potential of increasing after the course of preliminary ento-tourism activity. There is perhaps some need to improve the course of invertebrate activities in the current study in order to enhance interest among tourists towards invertebrates in future activities.

Willingness

Willingness was another factor that did not support *Ecotourism,* displaying insignificant value. During the survey, most respondents showed their lack of willingness to participate the course of preliminary entotourism activities. This could be caused by the thinking that it is not worthy to join such activities. As mentioned by Yi et al. (2010), many people are only willing to observe the beauty and subtle features of invertebrates.

Information

Information variable displayed insignificant value in influencing *Ecotourism*. This may be due to lack of information given during the course of invertebrate inclusion activities due to fewer discoveries about the existence of invertebrates around the Tabin trails. There is little invertebrate information as most invertebrates that had been highlighted during the course of preliminary entotourism activities were considered as common information and no inclusion of indigenous information of invertebrates was given due to lack of documentation about the invertebrate's indigenous information. Moreover,

only a few invertebrates had been identified scientifically in Tabin Wildlife Reserve especially in the Tabin trails. There was an abundance of invertebrates but these are not documented and studied yet. This dilemma could have an impact on invertebrate diversity in Tabin. If there is sufficient information, it can be used for ecotourism activities, education as well as for conservation purposes in future. This phenomenon has not only occurred in Tabin but in most places over the world. Most invertebrate species are still in the process of being described (Erwin, Pimienta, Murillo & Aschero, 2004) and this problem is prevalent in invertebrates with researchers still far from agreeing on the possible number of species of invertebrates (Wilson, 2000). Without a large scaling up of taxonomic efforts in most of these cases, species will disappear without even knowing they existed (Mackinney, 1999:1273).

Activity

Activity showed a good significant value towards Ecotourism in this survey. This indicates the strong potential of the inclusion of invertebrate information in ecotourism activities at Tabin Wildlife Reserve. This potential has the ability to broaden the scope of ecotourism activities by including invertebrate focused activities rather than just focusing on mammals or already endangered animals. It also helps to reduce redundancy in giving information to tourists by varying the focus of guided activity. Moreover, it would also be able to attract more attention and interest of tourists especially invertebrate enthusiasts, ento-lovers or entomologist to visit Tabin Wildlife Reserve. Apart from that, the operator has more choices or options related to activity packages to provide to tourists or visitors. This could lead commercial tour clients to lobby to protect invertebrates (Guclu & Karahan, 2004). The recreational dimensions of insects or entotourism are described in many entomological fields (Hutchins, 2003). Large concentrations of invertebrates might attract nature lovers for viewing and photography. Indeed, rare invertebrates mostly attract many scientists and specialist who want to gain knowledge or observe new species. Yi et al. (2010) described that these interactions can generate interest among tourists especially those who may want to experience how invertebrates contribute to human well-being.

Ecotourism

Structural Equation Modelling analysis revealed that 65 % variance of *Ecotourism* was well explained by all the independent variables stated above. This indicates that the independent variables influence *Ecotourism*, and there is potential to increase conservation of invertebrates through ecotourism.

This percentage showed that ecotourism is one of the tools that enhances and supports invertebrate conservation. Tourism has emerged in many countries as a means of providing financial resources needed to conserve biodiversity (Goodwin, Kent, Parker & Walpole, 1998). Since the ecotourism sector is the fastest growing subsector, its growth rate being three times that of tourism overall (Burns & Holden, 1995), it could perhaps boost efforts in invertebrate conservation. The potential of inclusion of invertebrate information in ecotourism activities at Tabin Wildlife Reserve is high and it could serve to not only broaden activities but it also help encourage invertebrate conservation work that has been ignored. The inclusion of invertebrate information in ecotourism activities has been practiced over the world and it seems to contribute to invertebrate conservation as well as for human economic benefits. Ecotourism mainly contributes to the economic, social and cultural wellbeing of communities that live close to ecotourism venues and other legitimate stakeholders. Indeed, it serves to minimise ecological costs and maximise ecological benefits (Weaver, 2008).

Conclusion and Implications

Conclusion

This research was conducted in order to encourage the conservation of invertebrates that been disregarded globally due to negative perceptions about invertebrates. The popularity of ecotourism perhaps can be used as a tool to boost conservation of many animals including invertebrates. The inclusion of invertebrates in ecotourism activities is rare globally but it still becomes good potential for preserving biodiversity. This research conducted in Tabin Wildlife Reserve, Lahad Datu, Sabah showed good results through which Structural Equation Modelling analysis revealed significant variance towards ecotourism. This implies potential on the inclusion of invertebrates in ecotourism especially in Sabah, and in turn, support the conservation of invertebrates through ecotourism.

Implications

The findings of this research are useful in contributing to literature and information about invertebrate conservation awareness specifically documentation on invertebrate tourism or entotourism information in Sabah. Very little research has been done globally to focus on entotourism to promote species conservation. Moreover, most tourism management in protected areas in Sabah surrounds large mammals and endangered wildlife species that are icons in Sabah's tourism sector. Instead of encouraging invertebrate

conservation activities, entotourism could broaden the scope of ecotourism activities that would help to minimize the negative impacts of tourism that stresses more on already endangered species.

Recommendation of invertebrate inclusion activities

The findings of this research indicate that it is quite feasible to include information regarding invertebrates into drives or walks in ecotourism activities. In addition, it has been established that there was positive response from both tourists and ecotourism service providers towards the inclusion of information on invertebrates into activities. The following recommendations are listed for implementation:

a. Rapid biodiversity assessments on invertebrates need to be undertaken at suitable ecotourism sites in Tabin Wildlife Reserve in order to identify the presence of species or orders suitable for inclusion in ecotourism activities.
b. The emphasis of the rapid invertebrate biodiversity assessments in Tabin Wildlife Reserve should highlight the presence of easily seen, endemic, new, charismatic or iconic orders or species.
c. Vernacular names should be used in listing the invertebrate species as this approach has been identified as one of the effective ways in increasing public awareness (Samways, 2002).

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