

## STRUCTURAL RELATIONSHIPS ON CONSUMER ECOLOGICAL BEHAVIOUR

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**Abstract:** This study aims to examine factors affecting consumer ecological behaviour. The study received 200 usable responses from respondents located in the Federal Territory of Labuan, Malaysia who have had experience in performing ecological behaviour such as doing recycling, using unleaded petrol, organic vegetables, ozone friendly aerosols, and any environmental related activities in the year of 2012. Structural Equation Modeling (SEM) analysis via AMOS 5.0 was used for data analysis as it has the ability to ensure the consistency of the model with the data and to estimate effects among constructs. Results via SEM revealed that environmental knowledge is the most influential factor that effect consumer ecological behaviour. The results offer a clearer perspective to companies for identifying the consumer ecological behaviour for better segmentation, targeting and positioning of market. This study provides a number of practical implications for marketers in boosting consumers' ecological behaviour.

**KEYWORDS:** Environment, ecological, knowledge, green products, Structural Equation Modeling.

### Introduction

Consumer ecological concern is related to their environmentally conscious on products with lower environmental impact such as being sensitive and responsive to environmental forces i.e. eco-friendly and green products. Responsible business and organization express their value of respect towards nature by producing, promoting, packaging and taking the product in manner does not harmfully affect human or natural environmental wellbeing (Simula, Lehtimaki & Salo, 2009). Self-declaration claims such as environment friendly, ozone friendly, organic, pesticide-free, degradable, and recyclable claims are described or placed on the product packaging by the manufacturer, retailer or marketer to guide consumer product assessment during purchases. Chen and Chang (2012) stated that consumers are willing to purchase green products that are not detrimental to the environment. Evidently, there were more than 80% of Thai, Malaysian and Korean consumers willing to pay premium price to purchase environmental products (Dunlap & Scarce, 1991; Lung, 2010).

In Malaysia, there is a development of green buildings such as the Gtower and IFirst Avenue in Kuala Lumpur, Malaysia, reflects green support by property industry. The green campaign used to elevate public awareness and participation in Malaysia is known as Sime Darby's *Plant a Tree Program* and Digi's *Mangrove-Saving Project*. Hewlett Packard (HP) through its eco-labelling, has warranty consumes' a products certification in most of their products by having a 'ENERGY STAR' label on its notebooks, desktop personal computers, monitors, workstations, printing and imaging products, and servers to confirm their active support towards green activities. Besides, they also recycle and reuse of recovered products. This initiative helps protect the environment that could minimise the risks of climate change.

Foregoing research studies were conducted on the consumer's perception or attitude towards green products (e.g. Haytko & Matulich, 2008; D'Souza, Taghian, Lamb & Pretiatko, 2007). Lee (2008) stated that there are minimal studies on the environmental issues in Asian countries, including Malaysia, as compared to the Western countries. This study aims to examine factors

affecting consumer ecological behaviour. People who behave in an environmental way are having a positive attitude towards buying ecological products, recycling and taking part in activities that seek environmental protection (Kahle, 1996). The results offer a clearer perspective to companies for identifying the consumer ecological behaviour for better segmentation, targeting and positioning of market. This study provides a number of practical implications for marketers in boosting consumers' actual purchase behaviour of green product.

### Literature Review

Consumer ecological behaviour is expected to be influenced by environmental knowledge, healthy food, and healthy way of life.

#### *Environmental Knowledge*

Environmental knowledge is related to "a general knowledge of facts, concept, and relationships concerning the natural environment and ecosystems" (Fryxall & Lo, 2003, p. 45). It involves what people know about the environment in terms of how the product is produced, how this affects the environment, and how collective responsibilities is necessary for sustainable development (Kaufmann, Panni, & Orphanidou, 2012). Consumer knowledge concerning environment includes knowledge on the greenhouse effect, waste management, hazardous waste and recycled material. There was a significant relationship between environmental knowledge and green consumer behaviour (Mostafa, 2009). If a consumer has knowledge about the causes and impact on the environment, their awareness level would increase and would potentially promote a favourable attitude towards green product (Cox, 2008; D'Souza, Taghian & Lamb, 2006). There is a possibility that the higher level of environmental knowledge might produce much better consumer ecological behaviour. Therefore the following hypothesis is proposed:

H<sub>1</sub>: Environmental knowledge significantly influences consumer ecological behaviour.

#### *Healthy Food*

A healthy food is related to foods that are able to normalize the biological body, physiological functions or maintaining the well-being of human bodies (Lu & Hsu, 2006). Consumer concern on their food choices that is healthy or would rather to skip an opportunity to eat. For example, they choose small packages to limit their food consumption (Scott, Maura, Stephen, Naomi, & Andrea, 2008), take dietary and supplementary foods and nutrients, concern with changes in weight and health impacts utility (Cawley, 2004). Ahmad and Juhdi (2008) noted that perception towards organic food affected consumers' pro-environmental behaviour. Limited research was conducted on the effect between healthy foods and consumer ecological behaviour. Hence, this study hypothesizes that:

H<sub>2</sub>: Healthy food significantly influences consumer ecological behaviour.

#### *Healthy Way of Life*

A healthy lifestyle is generally characterized as a balanced life in which one makes wise choices. Lifestyle focuses primarily on nutrition, exercise, smoking, and alcohol use. High level of environmental concern is expected due to the health issues (Said, Ahmadun, Paim, & Masud, 2003). Beliefs about product safety for use, and belief about product friendliness to environment does influenced consumers' pro-environmental behaviour (Ahmad & Juhdi, 2008). Preceding research (Wertenbroch, 1998) noted that restrained eaters make a choice to purchase small product, small packaged foods at a premium price to help them reduce caloric intake in order to have a healthy way of life. Catoi, Vranceanu and Filip (2010) confirmed that price fairness in business practices has a direct influence on perceived value and on buying intentions. However, Scott *et al.*, (2008) found that unrestrained eaters tend to consume more food when presented with larger-sized food in larger packages. Therefore, the following hypothesis is put forward:

H<sub>3</sub>: Healthy way of life significantly influences consumer ecological behaviour.

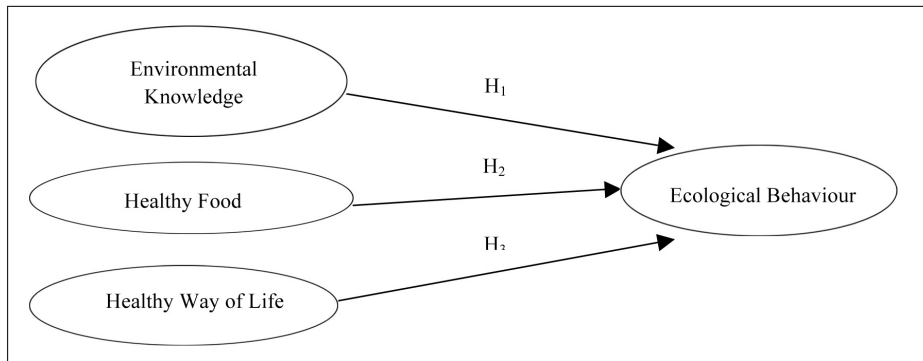


Figure 1: Theoretical Framework.

Based on the aforesaid literature, a theoretical framework is illustrated in Figure 1.

**Methodology**

Questionnaires were administered to a total of 250 respondents located in the Federal Territory of Labuan, Malaysia using convenience sampling technique. These consumer have had experience in performing ecological behaviour such as doing recycling, using unleaded petrol, organic vegetables, ozone friendly aerosols, and any environmental related activities in the year of 2012. However, a total of 200 unique and usable responses were successfully collected for a response rate of 80%. Data collection was conducted in a period of one month (from 1 July 2012 till 31 June 2012). The structured close-ended questionnaire comprised of three sections: Section A consisted of demographics profile, Section B requested the respondents to provide response on their personal experiences with ecological products and Section C examined the factors affecting consumer ecological behaviour where eleven items were used to measure the three independent variables (i.e. environmental knowledge, healthy food, and healthy way of life), and two questions were used to measure the dependent variable (i.e. consumer ecological behaviour). The questionnaire items were adapted from Fryxall & Lo (2003), Kaufmann *et al.*, (2012), and Lee (2008) with some modifications that suit to the current study. All items were measured on a five-point Likert Scale ranging from 1 (strong disagree) to 5 (strongly

agree). The measurement of items is available in Appendix A. Structural Equation Modeling (SEM) analysis via AMOS 5.0 computer program was used for data analysis as it has the ability to ensure the consistency of the model with the data and to estimate effects among constructs. It also has more flexible assumptions, use of confirmatory factor analysis to reduce the measurement error by having multiple indicators per latent variable, better model visualization, and the desirability of testing models overall rather than coefficients individually (Garson, 2009).

**Data Analysis**

Table 1 depicts the respondent’s demographic profile. There are 69% females and 31% males. Females can be regarded as part of a growing group of consumer in Malaysia. More than eighty percent of respondents are aged 20 to 22 years, and about 11% are 17 to 19 years. These young people, known as Generation Y, tend to have more concerned on the green environment and influenced their parents in purchasing decisions (Coddington, 1993).

Table 1: Demographic Profile of Respondents.

	Frequency	Percentage
Gender		
Male	62	31.0
Female	138	69.0
Age		
17-19 years old	21	10.5
20-22 years old	170	85.5
23-25 years old	9	4.5

### Structural Equation Modeling

SEM was undertaken utilizing the AMOS 5.0 computer program, with using maximum likelihood as the estimation method. A two-step SEM approach (i.e. measurement model and structural model) was employed to confirm the reliability and validity of the measures before examining the structural relationship between constructs.

### Measurement Model

Confirmatory factor analysis (CFA) was performed to test the validity of each construct in the model, including item loading, construct reliability, and average variance extracted (AVE). CFA is a commonly accepted method to test/confirm dimensionality (Netemeyer, Bearden, & Sharma, 2003). The results were summarized in Table 2. Each of the standardised loadings items is greater than 0.50 on their expected factor (Hair, Black, Babin, Anderson, & Tatham, 2010). Next, the reading of Cronbach's alpha and composite reliability for all the variables was also above the threshold value of 0.50, indicating a relatively high level of constructs reliability. The average variances extracted (AVE) of latent constructs, range from 0.765 to 0.809, have exceeded to the recommended threshold value of 0.50 (Hair *et*

*al.*, 2010). Hence, the current data have a good convergent validity.

The results reported in Table 3 portrayed that there is a significant positive correlation between all variables at the 0.01 level. Environmental knowledge has the strongest correlations with consumer ecological behaviour ( $r=0.298$ ,  $p<0.01$ ), followed by healthy way of life ( $r=0.288$ ,  $p<0.01$ ). Hence, there is no multicollinearity problem in this research. The skewness of all the items ranges from -0.031 to 0.232, underneath  $\pm 2.0$ . Similarly, the values for kurtosis ranges from 0.110 to 0.675, well lesser than the cut-off value of  $\pm 10$ . Both the skewness and kurtosis are lower than the said value, thus ensuring that the data used in the study is normally distributed. Means for all constructs range from 3.235 to 3.459 on a scale of 1=strongly disagree to 5=strongly agree. These means deduced that most of the respondents had a positive ecological behaviour.

Discriminant validity was checked by comparing the shared variances between factors with the squared root of AVE for each construct. Table 3 depicted that all shared variances of the construct with other constructs were lower than the squared root of AVE of the individual factors, confirming discriminant validity. Hence,

Table 2: Reliability and Validity Analysis.

Constructs	Items	Standardised Loadings	Cronbach's alpha	Composite Reliability	Average Variance Extracted
Environmental Knowledge	kno1	.695	0.722	0.706	0.781
	kno2	.650			
Healthy Food	hfood1	.538	0.760	0.764	0.771
	hfood2	.532			
	hfood3	.566			
	hfood4	.659			
	hfood5	.561			
Healthy Way of Life	hlife1	.553	0.866	0.827	0.809
	hlife2	.512			
	hlife3	.773			
	hlife4	.607			
Ecological Behaviour	eb1	.704	0.736	0.747	0.765
	eb2	.664			

Table 3: Correlation Analysis.

	1	2	3	4
(1) Environmental Knowledge	0.884			
(2) Healthy Food	0.353**	0.878		
(3) Healthy Way of Life	0.432**	0.478**	0.899	
(4) Ecological Behaviour	0.298**	0.202**	0.288**	0.875
Mean	3.459	3.309	3.358	3.235
Std Deviation	0.625	0.532	0.557	0.669
Skewness	0.009	0.232	0.033	-0.031
Kurtosis	0.110	0.675	0.470	0.540

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

Table 4: Goodness-of-fit Indices for Structural Model.

	$\chi^2$	df	$\chi^2/df$	CFI	GFI	NFI	RMSEA	PNFI	PCFI
Recommended Values	N/A	N/A	< 3.0	> 0.9	> 0.9	> 0.9	< 0.08	> 0.5	> 0.5
Model Values	120.752	59	2.047	0.966	0.962	0.981	0.073	0.506	0.561

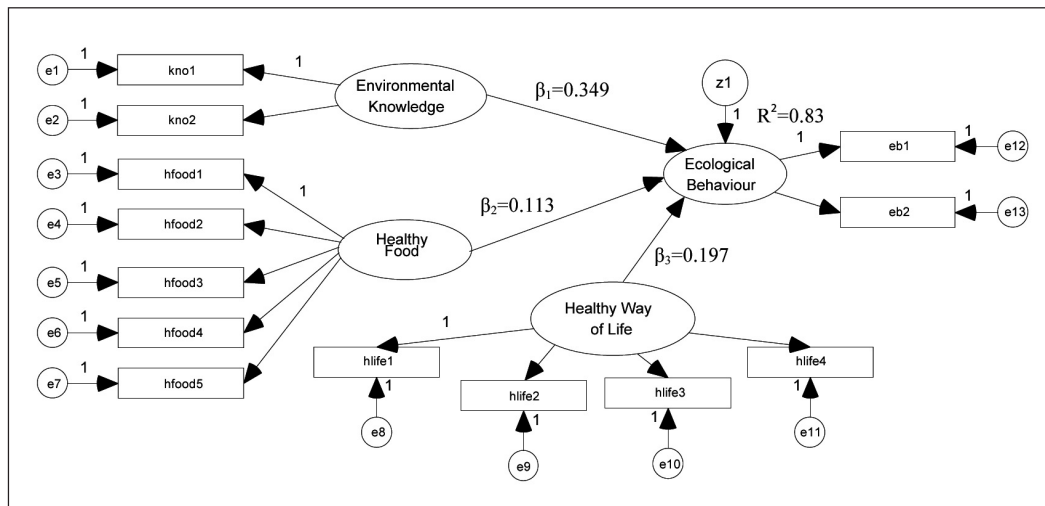


Figure 2: The Results of Structural Model.

each construct was statistically different from the others.

**Structural Model**

The structural model in the SEM was evaluated by examining fit indices and variance-explained estimates. Because there is no single universally accepted fit index, a variety of indices were used to assess the model’s overall goodness-of-fit (see Table 4). The results indicated that the  $\chi^2$  of the model was 120.752 with 59degrees of freedom ( $\chi^2/df = 2.047$ ) and RMSEA of 0.073.

The fit indices value for CFI, GFI, and NFI were above 0.90 and RMSEA below 0.08 (Bentler, 1990; Byrne, 2001), indicating a satisfactory fit. Therefore, the hypothesized model was a good fit and acceptable.

Table 5 and Figure 2 display the estimated standardized path coefficients of the structural model under investigation. The results exhibited that all independent variables accounted for 83% of the total variance in consumer ecological behaviour ( $R^2=0.83$ ). As a consequence, the results are a sign of adequate model fit between

Table 5: Relationship with Actual Purchase Behavior.

			Estimate	S.E.	C.R.	<i>p</i>
H1	Environmental Knowledge	---> Ecological_Behaviour	0.349	0.198	2.069	0.039*
H2	Healthy Food	---> Ecological_Behaviour	0.113	0.284	0.002	0.998
H3	Healthy Way of Life	---> Ecological_Behaviour	0.197	0.405	0.947	0.344

\*  $p < 0.05$

the proposed research model and the empirical data.

The study divulged that the strongest determinant of the consumer's ecological behaviour was environmental knowledge ( $\beta_1=0.349$ ,  $p<0.05$ ), as presented in Table 5. Therefore, H1 is supported. Healthy food ( $\beta_2=0.113$ ,  $p>0.05$ ) and healthy way of life ( $\beta_3=0.197$ ,  $p>0.05$ ) have insignificant relationship with consumers' ecological behaviour, thus H2 and H3 were not sustained.

## Discussion

This study aims to examine factors affecting consumer ecological behaviour. The results via SEM revealed that environmental knowledge is the most influential factor that effect consumer ecological behaviour ( $\beta_1=0.349$ ,  $p<0.05$ ). Thus, hypothesis 1 is sustained. The findings are consistent with preceding studies (e.g. Cox, 2008; D'Souza, Taghian & Lamb, 2006; Mostafa, 2009). Moser and Uzzell (2003) noted that media also plays a major role in this environmental knowledge of the consumers, that include recycling information and its benefits (Baker & Ozaki, 2008). The results implied that consumer heavily and actively uses environmental knowledge in evaluating products during purchasing decisions. They also continuously update their knowledge about ecological products and show interest in how ecological products are performed.

The result determined that healthy food show no effects on consumers' ecological behaviour ( $p>0.05$ ). In terms of healthy food practises, consumers do control the salt ingestion, try not to eat precooked food and

eat red meat moderately. They also try to eat food without additives. However, the current study found that these elements still unable to influence consumer ecological behaviour, as a consequence rejecting hypothesis 2. This is divergent with discoveries by Ahmad and Juhdi (2008). Given that the results found insignificant effect in terms of the relationship between healthy way of life on consumer ecological behaviour, with standardized beta coefficients of 0.197 at  $p>0.05$ , implying hypothesis 3 is not supported by the data. This study confirmed that consumer having some concern on the healthy way of life would not have impact on consumer ecological behaviour. Consumers practise healthy way of life, such as they find the balance between work and private life in order to reduce stress. They also take arranged and methodical life. These have affected their ecological behaviour. However, this is not in accordance with findings by Ahmad and Juhdi (2008); and Said *et al.*, (2003).

## Conclusion and Recommendations

The results of this study offer a new forward motion to the findings of earlier studies on consumer's ecological behaviour in Malaysia. Empirical analysis across a sample of 200 respondents confirms that environmental knowledge is able to influence consumer ecological behaviour. Consumers who are environmentally conscious are more likely to purchase ecological products. They look for products that use any of the following green related statement or assurance at the product label: no animal testing, natural ingredient cosmetics, wood product from sustainable forest, organic vegetables, ozone friendly

aerosols, biodegradability and unleaded petrol. Exposure in health promotion could change the way people think about lifestyle and how they work to improve health. There should be awareness on the importance of an educational program directed toward the community at large especially for students, explaining the significance of an environmental values and lifestyles as determining the factors of ecological consumer behaviour in any consumer purchase decisions.

Indeed, it is important for manufacturer, retailer or marketer to boost consumer's ecological behaviour and environmental knowledge by promoting and persuading positive perception toward organic products and its quality for greater green product market sustainability and acceptance. Assurance that the organic products are of high quality and competitively priced should be expanded and also clearly outlined in the company advertisement messages and strategic plan to maximize customers' satisfaction and increase purchases. This could be performed via effective green marketing campaigns or environmental related activities. Further research is deemed essential to expand the sample size and investigate at different geographical areas in order to enhance the understanding of consumer ecological behaviour, by not only covered in Malaysia perspective. Additional study is very much encouraged to examine factors affecting consumer ecological behaviour through analysing the data via structural equation modelling technique by investigating the presence of mediating variable of culture and moderating variable of demographics such as gender, age and education level.

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