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THE MEDIATING ROLE OF ECOLOGICAL BELIEFS BETWEEN PERSONAL VALUES AND ECOLOGICAL BEHAVIOUR

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ABSTRACT
Belief is considered an important component in influencing ecological behaviour. In VBN theory that developed specifically for the study of environmental related actions, ecological belief is being measured by three different variables. This seems making the situation more complex and complicated in measuring a person's belief. As such, this study aims to explore this value-belief relationship by using another approach. The value-belief relationship was tested by using a new single belief variable that needs to be more validated in more studies. Additionally, the mediating effect of ecological belief which is lack of understanding is also being tested. Results reveal that ecoaltruistic values and openness to change significantly affect both ecological belief and ecological behaviour. It is also found that ecological belief significantly affects ecological behaviour. Additionally, ecological belief mediates the relationships between ecolatruistic values and ecological behaviour as well as between openness to change and ecological behaviour. The present study is among the pioneers to consider ecological belief as the mediator between ecological values and ecological behaviour. The findings elaborate the existing knowledge of individual's ecological belief in the context of energy efficiency/ saving appliances purchase.

Keywords: *Ecological behavior, Ecological belief, Ecoaltruistic values, Openness to change*

Introduction

Belief is the state of mind in which a person accepting that something exists or is true (Pajares, 1992). For instance, if someone believes that studying hard will lead to good academic result, then he or she may invest time for revision. Generally, a human behaviour is guided and influenced by its own belief. This has been proven in many existing theories such as Theory of Reasoned Action (Mishra, Akman and Mishra, 2014; Paul, Modi and Patel, 2016), Theory of Planned Behaviour (Han, Meng and Kim, 2017; Paul et al., 2016), the Health Belief Model (Sharma and Romas, 2012) and etc.

In the context of environmental study, a prominent theory, Value-Belief-Norm (VBN) theory was developed to study this specific ecological behaviour (Stern, 2000). VBN theory postulates that different ecological belief systems towards the environment were found to be related to various pro-environmental behaviours (Chou, 2014; Huang, 2016; Raineri and Paille, 2016; Stern, 2000). Thus, belief is considered an important component in influencing the ecological behaviour (Lopez and Arango, 2008; Stern et al., 1999).

In recent years, there is a growing trend of ecological behaviour observed in many societies. Ideally, everyone should adopt such "green" behaviour in helping to protect and to reduce negative impacts towards the natural world. Currently, several studies explored that the ecological behaviour is shaped by the individual's values (Stern, 2000; Schultz and Zelezny, 1999). Hence, values can be regarded as the basis that form and influence the human behaviour.

According to Stern (2000), people are considering the implications of their behavioural choices before their actual behaviour especially for those things that they valued. Hence, environmental attitudes or beliefs can be considered an important antecedent of environmental behaviour. However, this value-belief relationship is being ignored in many studies. Even in VBN theory itself, the relationship between values and beliefs were not measured and tested directly (Steg, Dreijerink and Abrahamse, 2005). The beliefs variables are being represented by three other variables

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such as ecological worldview (NEP), adverse consequences for valued objects (AC) and perceived ability to reduce threat (AR).

As to date thus far, there is not many studies that exploring the relationships between ecological values and ecological beliefs. While there is a small number of studies have been attempted to explore this relationship empirically. Yet fewer have scrutinized the strength of an ecological value-belief and thereby evaluated its usefulness as a theoretical model for initiating and sustaining a broad societal engagement for environmental behaviour. This lack of empirical data is an obvious shortcoming in the literature.

Based on the above discussion, this study aims to investigate the mediating impact of ecological belief on ecological behaviour in green appliances (energy efficiency/saving) purchase context. This paper is organized as follows: First, an overview of the research background. Second, review of existing literatures and followed by proposing a conceptual framework. Third, methodology and discussion on findings are presented. Finally, conclusion, managerial implications and suggestions for future research are highlighted.

Literature Review

Research in environmental studies have focused on the ecological beliefs, understanding these as being the result of a rational costs-benefits analysis deriving from environmental behaviour (Gray, 1985). Lopez and Arango (2008) explained that ecological beliefs are refer to the beliefs about the relationship between human beings and the environment, as well as the consequences of ecological protection or deterioration based on personally valued aspects.

It is clearly seen that ecological beliefs are referring to the human-environmental relationship (Stern, 2000). Whereas O'Connor, Bord and Fisher (1999) revealed that ecological beliefs are refer to a sense of awareness and obligation that providing cues for appropriate environmental behaviour. Ecological beliefs can be represented by individual risk perception towards the environment (Schwarz and Thompson, 1990).

According to Duck (2004) environmental beliefs may indicate how people relate to the environment and its willingness to act so more or less environmentally friendly and may contribute to the understanding of ecological behaviour and its various manifestations. Thus, researchers began to present specific items on the characteristics of natural and environmental problems faced and general items on the man's relationship to the environment. Lopez (2002) believes that the environment can be understood as social beliefs about the relationship between the human being and the environment, ranging from an anthropocentric to an ecocentric concern.

There are previous studies (Chou, 2014; Corraliza, Collado and Bethelmy, 2013; Huang, 2016; Kheiry and Nakhaei, 2012; Raineri and Paille, 2016) that found the ecological beliefs are influencing different environmental or ecological behaviours. In VBN theory, ecological beliefs are being measured by three different levels (NEP, AC and AR). Even, it is proven that there is relationship between beliefs and ecological behaviour (Duck et al., 2005). But, this seems that make the situation more complex and complicated in measuring a person's belief. As such, there is another approach in dealing with this construct.

In Singh's (2011) study, there are six items developed in measuring certain concerns and reactions of the respondents in measuring their beliefs towards some environmental issues. Such measures simplify the belief variables in environmental studies and need to be validated in more studies as it is still consider a relatively new variable. Another contribution as well from this study will be to test the mediating effect of ecological beliefs between the relationship of ecological values and ecological behaviour which is still lack of understanding.

The present study is adopting the later approach which is considers a new way of handling the issue pertaining to human's belief. There are many existing theories that measure the belief through the representative of different variables. Thus, a simpler approach in dealing this variable is much desired and needed.

Conceptual Framework and Hypotheses

Stern's (2000) VBN theory suggests that a strong ecological value orientation could influence the ecological beliefs and determines the practice of pro-environmental action. Sagie and Elizur (1996) revealed that human values direct the beliefs and behaviour of people and can be related to specific focuses of functioning, as well as form interrelated structures. Therefore, this theory helps to explain the relationship between ecological values and ecological beliefs (Jahangiri and Zarei, 2016; Lopez-

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Mosquera and Sanchez, 2012). In brief, personal ecological values can be thought as a cognitive process or a way of thinking related environmental beliefs to act in a method to advantage other social beings (Steg et al., 2014).

It has been empirically validated that values is link to some specific beliefs and behaviour. Values therefore are used as the antecedent for variables such as attitudes and behavioural intention (Stern, 2000; Stern and Dietz, 1994). Hence, the following hypotheses are proposed:

H1: Ecoaltruistic values have positive influence on ecological belief.
H2: Openness to change has positive influence on ecological belief.

According to the Expectancy Value Theory, behaviour is a function of the expectancies one has and the value of the goal towards which one is working (Fishbein and Ajzen, 1974). A person will act accordingly if they think that such an act is important and having value to them. Hence, the degree of positive and negative values for a particular situation will be evaluated and it will affect the actual behaviour (Palmgreen, 1984). This theory helps to link the value-behaviour relationship. For instance, if a person thinks that protecting the environment is important and is for the benefits of their future generations, then they tend to practice more pro-environment behaviour.

Scott and Willits (1994) found that the general attitudes toward the environment is moderately related to the various pro-environmental behaviour scales. The general attitudes also having influences on a wide range of specific attitudes (Vining and Ebreo, 1992). In conclusion, environmental attitudes or concerns are playing an important role in explaining ecological actions. Hence, the following hypotheses are proposed:

H3: Ecoaltruistic values have positive influence on ecological behaviour.
H4: Openness to change has positive influence on ecological behaviour.

Cognitive Behavioural Theory (CBT) is a theory that centered around three components: cognitive, emotion and behaviour that all interact together. Under the CBT, human's core belief (self-concept) will influence behaviour (Beck et al., 1979). In other words, a belief that holds by a person (who you want to be) will be reflected in his or her behaviour (Beck et al., 1979). For instance, if a student wanted to score a good grade, he or she will spend more time to study as to achieve the goal. This theory helps to link the belief-behaviour relationship.

Ecological beliefs were found to have relationship to various environmental actions or behaviour (Stern, Dietz and Guagnano, 1995; Schultz and Zelezny, 1999). A research that conducted by Amerigo, Aragones, Sevillano and Cortes (2005) in Spain revealed that environmental beliefs (both anthropocentric and ecocentric concerns) are related with the natural environment. While in other studies by Schultz (2000; 2001), beliefs are related to the consequences of environmental problems towards oneself, other human being and also other forms of life in the environment. Hence, the following hypothesis is proposed:

H5: Ecological belief has positive influence on ecological behaviour.

Under the CBT, anything happens in an individual's environment or the feeling about a situation will influence a human's belief (Beck et al., 1979). Such belief in turn will affect the human's behaviour (Beck et al., 1979). The belief in this context is refers as how the individual interprets an event that subsequently affecting how an individual thinks or believes about a situation. Hence, a human's belief is mediating between the personal values and behaviour (Beck et al., 1979). This theory is helps in explaining the mediating effect of ecological beliefs towards the relationship between values and behaviour. For instance, if a student wanted to score a good grade, if he or she believes that it is achievable then he or she will spend more time to study as to achieve the goal.

Duck, Ros and Tamayo (2005) argue that environmental beliefs, seen as a system or world view, can be direct antecedents of ecological behaviours. These authors believe that ecological beliefs contribute to a positive expression actions in favor of the environment. Therefore, the following hypotheses are proposed:

H6: Ecological belief is mediating the relationship between ecoaltruistic values and ecological behaviour.

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H7: Ecological belief is mediating the relationship between openness to change and ecological behaviour.

Thus, this study proposed the following research model that presents ecological behaviour as a consequence of direct and indirect relationships with ecological belief and ecological values (see Figure 1).

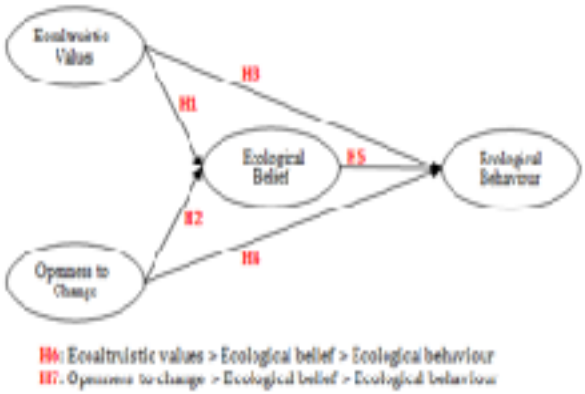

Figure 1: Research Framework

Methodology

To ensure the data is within the appropriate ranges and no missing values, several descriptive analyses were performed. Maximum, minimum and missing values were checked. To deal with the outliers, standardized scores (z-scores) were generated. The results showed that the scores were less than ±3.29 and thus the data set is free from outliers (Hair et al., 2014).

Next, the demographic information of the respondents were analyzed. Majority of the respondents were male (54.3%), aged between 20 to 30 years old (57.6%) and mostly participated by Malay (53.8%). 67.5% of the respondents were single and 55.7% were Muslims. In term of education and income levels, more than half of the respondents (53.3%) were having Bachelor degree qualification and majority (54.3%) were earning below RM2000 per month.

The survey questionnaire asked a few questions pertaining to the respondents' purchase experiences with energy efficiency/saving appliances. Those information were recorded as follows: 40.7% respondents used energy efficiency/saving appliances between 1 to 3 years, 76.7% respondents bought energy efficiency/saving appliances with the aim to save electricity cost. The top three appliances that bought by the respondents the last six months were air-conditioner, refrigerator and television.

Prior to assess the model, the presence of common method variance (CMV) was checked. CMV exists when one variable explained more than 50% of the variance. As recommended by Podsakoff, MacKenzie, Lee and Podsakaff (2003), Harman 1 factor can be used to check the presence of CMV. The results showed that none of the variable explained more than 50% of the variance, hence the CMV was not considered a serious problem in this study.

Data Analysis

To predict the relationships among the constructs, partial least square (PLS) structural equation modeling is used (Henseler et al., 2009). With the support of SmartPLS 3.0, a measurement model (outer model) and a structural model (inner model) were obtained as to evaluate the conceptual model. The outer model testing the relationship between construct and its items, whereas the inner model testing the relationships among exogenous and endogenous constructs (Hair et al., 2014).

To assess the measurement model, composite reliability, convergent validity and discriminant validity of the constructs were examined. Factor loading and composite reliability were generated as to check the reliability of the measurement items. Table 1 below shown that all the values of factor loading and composite reliability exceeded the recommended values of 0.5 and 0.7 which satisfy the reliability at item and construct levels (Hair et al., 2014; Henseler et al., 2009).

Table 1: Evaluation of Measurement Model

Construct	Item	Loadings	Composite	AVE

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Ecoaltruistic Values	ECB1	0.740	0.8005	0.5011
	ECB2	0.719		
	ECB3	0.695		
	ECB4	0.676		
Openness to Change	SOB1	0.742	0.8953	0.5177
	SOB2	0.776		
	SOB3	0.656		
	SOB4	0.627		
	SOB5	0.727		
	SOB6	0.727		
Ecological Belief	STB1	0.774	0.8593	0.5059
	STB2	0.784		
	STB3	0.653		
	STB4	0.681		
	STB5	0.645		
	STB6	0.718		
Ecological Behaviour	EBH1	0.631	0.9365	0.6235
	EBH2	0.744		
	EBH3	0.862		
	EBH4	0.701		
	EBH5	0.763		
	EBH6	0.902		
	EBH7	0.833		
	EBH8	0.782		
	EBH9	0.851		

The validity of measurement model is assessed based on discriminant validity and convergent validity. Table 1 shows that values of average variance extracted (AVE) and composite reliability for all constructs are larger than 0.5 and 0.7 respectively and thus, indicating that it meets the acceptable standard of convergent validity (Fornell and Larcker, 1981; Henseler et al., 2009).

Discriminant validity is assessed by using Fornell-Larcker's (1981) criterion method. In Fornell-Larcker's (1981) criterion method, the square root of the AVE of a construct has to be greater than the correlations between other constructs in row and columns. Table 2 below shown that this condition is met and hence confirm the discriminant validity at construct level.

Table 2: Discriminant Validity

	ECB	SOB	STB	EBH
EAV	0.769			
OTC	0.564	0.843		
EBL	0.641	0.629	0.827	

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EBH	0.594	0.709	0.721	0.738

Note: EAV-Ecoaltruistic Values, OTC-Openness to Change, EBL-Ecological Belief, EBH-Ecological Behaviour

Structural model evaluation was undertaken to test the research hypotheses. To assess the structural model, the path coefficient and t-value of the model were generated by applying PLS algorithm and bootstrapping procedure with 5,000 resamples. The results are presented in Table 6 below.

The R^2 for the endogenous variable in this study were 0.614 which indicating that the ecological values had explained 61.4% of the variance in ecological belief and 0.549 which indicating that ecological belief had explained 54.9% of the variance in ecological behaviour. Ecoaltruistic values ($\beta = 0.208$, $t = 3.027$, $p < 0.01$), openness to change ($\beta = 0.212$, $t = 2.990$, $p < 0.01$) are found significant related with ecological belief. For the relationship between ecoaltruistic values and ecological behaviour ($\beta = 0.361$, $t = 4.815$, $p < 0.01$) and also between openness to change and ecological behaviour ($\beta = 0.330$, $t = 3.420$, $p < 0.01$), both were significant. Therefore hypotheses H1-H5 were supported as shown in Table 3.

Table 3: Results of Hypotheses Testing

Hypothesis	Coefficient	t-value	Supported
H1	0.208	3.027	**Yes**
H2	0.212	2.990	**Yes**
H3	0.361	4.815	**Yes**
H4	0.330	3.420	**Yes**
H5	0.178	2.787	**Yes**

The findings also supported by the Q^2 value of Stone-Geisser's predictive relevance. Q^2 value of 0.603 for ecological belief and 0.290 for ecological behaviour were obtained after the blindfolding procedure. Both values were larger than zero, indicating the predictive relevance of the PLS path model (Hair, Ringle & Sarstedt, 2011; Henseler et al., 2009). Thus, the exogenous variables showed its capability to predict the endogenous variable.

In order to examine the mediation effect of ecological belief, bootstrapping the indirect effect with 5,000 resamples was implemented (Preacher and Hayes, 2004). The bootstrapping analysis showed that the indirect effect of H6 was significant with $\beta = 0.228$, $t = 4.215$, $p < 0.01$. The bootstrapping analysis for H7 was significant with $\beta = 0.169$, $t = 2.557$, $p < 0.01$. Thus, it is concluded that ecological belief mediated the relationships between ecoaltruistic values and ecological behaviour as well as between openness to change and ecological behaviour as depicted in Table 4.

Table 4: Results of Indirect Testing

Hypothesis	Coefficient	t-value	Supported
H6	**0.228**	**4.215**	Yes
H7	**0.169**	**2.577**	Yes

Conclusion

This study aimed to examine the direct and indirect influence of ecological values and ecological belief towards ecological behaviour in Malaysian consumer context. Based on the results, it can be concluded that ecoaltruistic values and openness to change are found to be positively related to both ecological belief and ecological behaviour. The relationship between ecological belief and ecological

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behaviour is also found to be significant. These results were come in line with existing theories such as TRA, TPB, HBM and etc.

Additionally, ecological belief was found to be mediating the relationship between ecoaltruistic values and ecological behaviour as well as between openness to change and ecological behaviour. Such findings simplify the measure of ecological belief and also validating this relatively new variable in other study.

The study has several limitations that could provide research directions for the future researchers. For instance, this study examined the posited relationships among electrical appliances consumers only. Future research may use other study contexts to achieve different perspective of the phenomenon. In addition, more cross-cultural research is needed in order to compare whether those factors study in the present study will have similar results with different segments and cultural groupings.

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