

The Roles of Knowledge, Threat, and PCE on Green Purchase Behaviour

Booi-Chen Tan

Faculty of Management, Multimedia University
Persiaran Multimedia, Cyberjaya 63100, Selangor, Malaysia
Tel: 60-3-8312-5721 E-mail: tbchen@yahoo.com

Received: July 5, 2011

Accepted: August 5, 2011

Published: December 1, 2011

doi:10.5539/ijbm.v6n12p14

URL: <http://dx.doi.org/10.5539/ijbm.v6n12p14>

Abstract

With an increasing pressure of environmental deterioration, many firms have started to be socially responsible by developing green products to meet the demand of environmentally conscious consumers. These firms are interested in finding the determinants of green purchase behaviour in order to develop effective communication messages and derive green purchase commitments. The effects of environmental knowledge, environmental threat and perceived consumer effectiveness (PCE) in motivating one's behavioural change to engage in pro-environmental behaviour have been tested in the past, but they have not been tested together in the context of green purchase behaviour in Malaysia. Therefore, this paper reviews the conceptual and empirical literatures of the aforementioned variables in explaining the environmental attitude and behaviour, and proposes a conceptual model to be considered for future green purchase behavioural studies. The finding is expected to provide guidance for firms to profile the green buyers and position its green product more effectively.

Keywords: Environmental knowledge, Environmental threat, Perceived consumer effectiveness, Environmental attitude, Green purchase attitudes, Green purchase behaviour

1. Introduction

In today's competitive business environment, both profit oriented and socially responsible firms have started to adopt the concept of green marketing and address the environmental issues as a source of competitive advantage in developing and promoting green product to meet the demand of environmentally conscious consumers. To influence the purchase interest and actions of customers towards green products, green advertising messages must be informative and persuasive enough in deriving the desirable targeted business outcomes. The advertising claims such as "eco-friendly" and "biodegradable" are the common terms available in the market but its effectiveness in convincing green purchase action is still insignificant (Peattie, 2001). As a result, firms have started to identify and understand the determinants of environmental attitude and green purchase behaviour in order to deliver an effective and persuasive advertisement in their communication strategies.

The effects of environmental knowledge, threat perception and perceived consumer effectiveness in motivating one's behavioural change to engage in general pro-environmental behaviour have been tested in the past. For instances, the fear or perceived threats from the environmental problems to individual's health or well-being, the knowledge of environmental issues and an extent to which an individual believes that his or her efforts can be effective in pollution abatement have motivated one's behavioural change to engage in pro-environmental behaviours both in the purchase and non-purchases in contributing to a better environmental quality. However, the past empirical studies conducted on the roles of these three variables together in explaining the attitudes and behaviour in the context of green purchase behaviour are still lacking in Malaysia. Malaysia is a developing country facing great challenges in ensuring a balance between development and environmental sustainability. Any remedy to preserve the Earth's resources requires not only a radical rethink and action of government and business, but also the immediate changes in attitudes and behaviours of consumers to contribute to the sustainable and diminished use of nature resources.

Therefore, the purpose of this paper is to develop a conceptual model of green purchase behaviour to examine the integrating effects of environmental knowledge, threat, and PCE on attitudes and behaviour. This paper is structured as follows: we first review the literature pertaining to the conceptual theories of variables, followed by the empirical findings reported in the past on the effects of the aforementioned variables in explaining environmental attitudes and behaviour. This leads to the development of propositions for this study. Next, the

development of the conceptual research model is described. Finally, the research objectives to be considered for future research undertaking in the context of green buying behaviour are proposed.

2. Literature Review and Proposition Developments

2.1 Green Purchase Behaviour and Green Products

Today, many firms have embraced the era of green marketing and used the environmental issues as a source of competitive advantage in their business operation. It is because to remain competitive in the market, firms would have to become more environmentally and socially responsible (Roberts, 1996). Green purchase behaviour is one of the pro-environmental behaviours (Chan, 2001; Kim, 2002; Kim and Choi, 2003; 2005; Mostafa, 2007). It refers to the purchasing and consuming products that have minimal impacts on environment (Mainieri, Barnett, Valdero, Unipan and Oskamp, 1997). Obviously, firms are willing to operate in a sustainable manner but provided by doing so could enable them to gain competitive advantage. However, it is still questionable on the green purchase commitment if there are sufficient green products available in the market (Chan, 1996) as the share of green market activities is still lacking (Peattie, 2001; Kalafatis, Pollard, East and Tsogas, 1999; Shrum, McCarty and Lowrey, 1995). Although the number of visitors who had visited the Eco Product International Fairs in Asian since 2004 to 2009 had increased dramatically from 11,493 to 83,469 (Asian Productivity Organization, 2009), but how many of them had shifted from buying conventional product to green product are still unknown.

In generally, green products refer to those products that will not pollute the earth or deplete natural resources, and they can be recycled or conserved (Shamdasani, Chon-Lin and Richmond, 1993). Some of the examples of green products in the market are the “household items manufactured with post-consumer plastics or paper, recyclable or reusable packaging, energy-efficient light bulbs and detergent containing ingredients that are biodegradable, non-polluting and free of synthetic dyes or perfumes” (Mostafa, 2007, p.220). In Malaysia, the eco-labelling scheme was launched in 2004 and managed by SIRIM QAS. It has been offered to four categories of product: biodegradable cleaning agents, non-toxic plastic packaging material, recycled paper and hazardous metal-free electrical and electronic equipment (Standards and Quality News, 2004). Green product addresses the environmental issues in terms of its characteristics of recyclability, reusability, refillability, long life, degradability or compostability, high quality in terms of its green performance, energy saving, and using recycled materials (Eco-product directory, 2008). As a result, It is essential to encourage and promote the environmental responsible consumption behaviour such as purchasing the green products to minimize the direct and indirect impacts from the individual consumption decision on the environmental degradation, especially in the trend of urbanization, changing lifestyle as well as increasingly number of affluence people in Malaysia.

2.2 Attitudes

Fishbein and Ajzen (1975) define attitude as “a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object” (p.211). It is “an enduring set of beliefs about an object that predisposes people to behave in particular ways toward the object” (Weigel, 1983, p. 257). It refers to the “psychological tendency that is expressed by evaluating a particular entity with some degree of favour or disfavour” (Eagle and Chaiken, 1993, p.1). Conceptually, attitudes can be divided into general and specific attitudes (Sun and Wilson, 2008). A specific attitude is a strong predictor of a single behaviour on a particular attitude object; while a general attitude explains the general tendency to engage in relevant behaviour of a category of attitude object (Ajzen and Fishbein, 1977; Hines, Hungerford and Tomera, 1986-87; Eagle and Chaiken, 1993). Sun and Wilson (2008) argued that both types of attitude should be studied together in an empirical research, as the formation of specific attitude toward a new object is likely to be influenced by the general attitudes as well. Besides, a more complete understanding of attitude can be derived from considering and clarifying both type of attitudes in one study (Eagly and Chaiken, 1998). However, this combination of study is limited in the context of green purchase behaviour studies.

Theory of Reasoned Action (Fishbein and Ajzen, 1975) is a popular theory used to discuss the attitude-behaviour relationship. It has been applied extensively in the non-environmental and environmental related studies. It provides a useful framework to examine the influence of attitudes, subjective norm on intention, and intention to behaviour. According to this theory, attitude and behaviour are correlated in three circumstances. First, the observed behaviour must be relevant to the attitudinal measure in the research. Second, the attitude and behaviour examined must be at the comparable or same levels of specificity. Third, behavioural intention acts as a mediator between attitude and behaviour. Fishbein and Ajzen warned against the use of general attitudes to predict specific behaviour and suggested that a specific attitude is better than general attitude in predicting the specific behaviour. In other words, the more specific the attitude measure is; the stronger would be its correlation with the behavioural action.

Consequently, Ajzen (1991) extended the theory of Reasoned Action and proposed the Theory of Planned

Behaviour by adding the construct of perceived behavioural control to explain the behavioural intention and actual behaviour. Perceived behavioural control refers to an individual's perceptions of his or her ability to perform a given behavior. An individual's perceived ease or difficulty of performing the particular behavior not only affect actual behavior directly, but also affect it indirectly through behavioral intention. Although both theories have been used extensively in environmental behavioural studies (Soonthonsmai, 2001; Kalafatis et al., 1999; Tarkiainen and Sundqvist, 2005; Vermeir and Verbeke, 2007), however, Davis, Foxall and Pallister (2002) indicated that behavioural intention fail to predict actual recycling behaviour and suggested that the intention-behaviour hypothesis should be abandoned in the future study.

2.2.1 General Environmental Attitude

Schultz, Shriver, Tabanico and Khazian (2004) defined environmental attitude as “the collection of beliefs, affect, and behavioural intentions a person holds regarding environmentally related activities or issues”. It refers to the degree that an individual perceives himself or herself to be an integral part of the natural environment (Schultz and Zelezny, 1999). Milfont (2007, p.12) defined the environmental attitude as the “psychological tendency that is expressed by evaluating perceptions of or beliefs regarding the natural environment, including factors affecting its quality, with some degree of favour or disfavour”. In other words, it refers to the general level of concern that a consumer has towards the wellbeing and importance of the environment. As such, some of the environmental sociologists have referred to the attitudes towards the natural environment as “environmental concern” (Vining and Ebreo, 1992; Fransson and Garling, 1999; Dunlap and Jones, 2002). The terms of environmental attitude and environmental concern have been used interchangeably in many studies (Dunlap and Jones, 2002). However, some of the studies have differentiated them (Stern and Dietz, 1994; Schultz et al., 2004).

In terms of the environmental attitude measures, Ecology Scale (Malonet and Ward, 1973; Maloney, Ward and Braucht, 1975), Environmental Concern Scale (Weigel and Weigel, 1978), and the New Environmental Paradigm Scale (Dunlap and Van Liere, 1978; Dunlap, Van Liere, Mertig and Jones, 2000) are the popular environmental attitude measures used in the past (Fransson and Garling, 1999; Dunlap and Jones, 2003). New Environmental Paradigm Scale (NEP) measures overall relationship between human and the environment and it had been revised from 12 items to 15 items. Dunlap et al. (2000) summated up these 15 revised NEP items to an unidimensional approach, but some of the researchers factorised the items into five hypothesized factors of an ecological worldview into (1) the reality of limits of growth, (2) antianthropocentrism, (3) the fragility of nature's balance, (4) rejection of exemptionalism, and (5) the possibility of an ecocrisis (Roberts and Bacon, 1994). The unidimensional of environmental attitude measure is the common approach used extensively to predict environmental behaviour (Schultz and Oskamp, 1996; Thapa, 1999; Schultz and Zelezny, 1999; Kim, 2002; Nordlund and Garvill, 2002; Kim and Choi, 2003; 2005; Bedrous, 2007), compared to multidimensional approach of environmental attitude measure.

2.2.2 Inconsistency of Attitude-Behaviour Relationship

The empirical findings reported on the use of general environmental attitude to predict generalized environmental behaviour and a specific environmental behaviour were contradictory. Past studies have reported a positive relationship between environmental attitude and pro-environmental behaviour (Kim, 2002; Kim and Choi, 2003; Straughan and Roberts, 1999) as well as environmental attitude and green purchase behaviour (Kim and Choi, 2005; Tilikidou, 2006; Grunert and Juhl, 1995; Aoyagi-Usui, 2001; Schlegelmilch, Bohlen and Diamantopoulos, 1996; Diamantopoulos, Bohlen and Schlegelmilch, 1994). However, a meta-analysis conducted by Hines, Hungerford and Tomera (1986-1987) revealed that the lower attitude-behaviour correlation was found when attitude was operationalized as a general environmental attitude compared to when it was operationalised as a specific attitude towards environmental behaviour. In addition, behaviour to buy product because of environmental claims, to consider safety to the environment when making a purchase, to switch products for environmental reasons or purchase brands packaged in recyclable or reusable containers were only significantly related to specific environmental belief (specific attitude), but not the general environmental concern (Maineiri et al, 1997). As a result, Maineiri et al. (1997) provided four reasons regarding the inconsistencies in attitude-behavior relationships; (1) low correlations among environmental behaviour as not all the environmental behaviours are interchangeable, (2) different levels of specificity in the measures of attitude and behaviour, (3) effects of extraneous variables, and (4) lack of measurement of reliability and validity. Subsequently, Bamberg (2003) also indicated that the weak direct relationship between environmental attitude and specific environmental behaviour is due to the incorrect assumption that general attitudes like environmental concern are direct determinants of specific behaviours. Bamberg argued that only situation-specific cognitions are direct determinants of specific behaviours, future research should not view the environmental concern as a direct predictor, while it should be viewed as an indirect determinant of specific environmental behaviour. Therefore, a need to study a specific behavior with a specific attitudinal measure was suggested in order to have a closer

association between attitude and behaviour (Cleveland, Kalamas and Laroche, 2005).

2.2.3 Attitudes towards Green Purchases

Attitudes towards the behaviour refer to one's beliefs or feelings towards the impacts of undertaking a specific behaviour on the environment (Hines et al., 1986-1987; Kaiser and Gutsche, 2003; Riethmuller and Buttriss, 2008). It is important to distinguish between attitudes towards the environment (general attitude) and attitude towards a specific type of environmental behaviour (specific attitude) as this distinction is a major reason leads to attitude and behaviour gap (Kaiser et al., 1999; Bamberg, 2003). In terms of its measurement scale, it is unlike the New Environmental Paradigm Scale (NEP) or revised NEP, the measurements of consumer's attitudes towards a specific environmental behaviour differ according to the interests of researchers. However, the concept of "importance" and "inconvenience" are the most studies attitudes in the ecological literature (Laroche, Bergero and Barbarot-Forleo, 2001). Researchers have investigated the effects of attitude towards the "importance of recycling" and "inconvenience of recycling" on the recycling behaviour (McCarty and Shrum, 1994; 2001). Besides, how consumers view environmentally friendly behaviours as important to themselves or society as a whole will certainly affect their willingness to pay more for green products (Laroche et al., 2001).

Inconvenience refers to how inconvenient it is perceived by the individual to behave in an environmentally friendly way (McCarty and Shrum, 1994; 2001). The concept of convenience was first appeared in the use of marketing related to those intensively distributed products that required minimal time and physical and mental effort to purchase (Copeland, 1923). Some researchers viewed convenience as an attribute that reduces the nonmonetary price of product such as time and energy expenditure (effort) consumers used in purchasing a product rather than a characteristics or attribute of a product (Brown, 1990). In the context of green purchases, an individual who supports the "importance" of being environmentally friendly and feels "convenience" to act in an environmental friendly manner is more likely to buy and pay more for environmentally friendly products or green products (Laroche et al., 2001; Cheah and Phau, 2006; Tsen, Phang, Hasan and Buncha, 2006; Majláth, 2008; Ng, 2009).

Peattie (2001) proposed a green purchase perception matrix and implies that "understanding environmental purchasing behaviour is assisted by looking at the extent to which other things are not equal". It means that instead of trying to understand the purchasers, researchers should understand the purchases. He suggested that green purchases for specific product may vary according to the purchaser's degree of compromise involved and degree of confidence generated in the environmental benefits of a particular choice. The compromises include paying the premium price, travelling further to purchase a green product, and accepting a lower level of technical performance in exchange for improved eco-performance. Peattie revealed that consumers' confidence and compromises are the most important influential factors on their green purchase action. Following, based on this matrix, Hu (2007) investigated the green purchase intention among the Chinese consumers in Taiwan and reported that the degree of confidence affects green purchase intention positively, while the degree of compromises affect green purchase intention negatively. However, the studies focused on the degree of confidence and comprises in purchasing green products, together with the attitude towards importance and convenience of green purchases have received little attention and have not been empirically tested among the consumers in Malaysia. Therefore, the following propositions are put forward:

- P1. If an individual is concerned about the environment, he or she will have a favourable attitude towards green purchases.
- P2. If an individual is concerned about the environment, he or she will engage in green purchase behaviour.
- P3. If an individual has favorable attitude towards green purchases, he or she will engage in green purchase behaviour.

2.3 Cognitive-Affective-Conative (Hovland and Rosenberg, 1960)

As suggested by Hovland and Rosenberg (1960), an attitude model consists of three components: cognitive, affective, and conative. According to them, cognitive component refers to the thoughts or beliefs, affective component consists of positive or negative feelings or emotions, and the behavioural component refers to the actions or intentions to act towards the attitude object. Based on this attitude model, advertising hierarchy of effects model was developed by Lavidge and Steiner (1961). This is a marketing communications model which proposes that consumer passes through a sequential order from initial awareness (cognitive stage), to liking, preference and conviction (affective stage), and to actual purchase (behavioural stage). It means that in order to reach to the final stage of purchase decision, a buyer is expected to pass through his or her cognitive (awareness and knowledge), affective (liking, preferences), and behavioral actions to purchase the favorable products or services. The marketing communication messages are important in informing, educating and channeling the right information to current and future consumers to arouse their interest and purchase actions ultimately, especially in attracting and convincing the public to shift from buying conventional products to green products.

2.3.1 Knowledge

Knowledge is the amount of information held in one's memory that affects the way in which consumers interpret and assess the available choices (Blackwell, Miniard and Engel, 2001). Conceptually, consumer knowledge can be divided into two components: objective knowledge and subjective knowledge. Objective knowledge refers to the content and organization of knowledge (factual knowledge) that is stored in one's memory. It refers to what an individual actually knows about a type of product/issue/object. Whereas the subjective knowledge refers to the perceptions or assessments of the individual on what they know and how much they know about a product/issue/object (Brucks, 1985; Dodd, Laverie, Wilcox and Duhan, 2005). As such, we will discuss the theoretical definition, measurements, and the empirical findings related to the environmental knowledge of consumers in the next section.

2.3.2 Environmental Knowledge

Environmental knowledge refers to one's ability to understand and evaluate the impact of ecosystem on the society, and the amount of knowledge he or she has about environmental issues (Chan, 2001; Haron, Paim and Yahaya, 2005; Aini, Nurizan and Fakhru'l-Razi, 2007). Laroche et al. (2001) defined the environmental knowledge as one's ability to identify or define a number of ecologically-related symbols, concepts and behaviour. Schahn and Holzer (1990) have identified two types of environmental knowledge to examine the environmental behaviour, which were namely abstract (knowledge concerning environmental issues, problems, causes, solution) and concrete behavioral knowledge (such as factual knowledge). According to them, abstract environmental knowledge is more likely to affect environmental action, rather than the factual knowledge. Consistently, Tanner and Kast (2003) also reported that the action related knowledge was positively related to green food purchases, whereas the factual knowledge was not a predictor of green food purchases. However, Rolston and Di Benedetto (1994) warned against the use of factual environmental knowledge to predict environmental behaviour, because even the experts could not agree on a product's effect on the environment.

2.3.3 A linear relationship between Environmental Knowledge, Environmental Attitude and Behaviour

Kollmuss and Agyeman (2002) raise the concern regarding the links of environmental knowledge, environmental attitudes and environmental behaviour as the linear progression model proposed in the past decades was proven wrong and suggested to the future researchers to consider examining the additional internal and external factors in explaining pro-environmental behaviour. An ecological consciousness framework which consists of has been environmental knowledge (cognitive), environmental attitudes (affective), and environmental behaviour (conative) has been constructed (Schlegelmilch, Bohlen and Diamantopoulos, 1996; Tilikidou, Adamson and Sarmaniotis, 2002). Researchers are more interested in the bivariate relationships between each of the variables, rather than the causal linkages between the variables. In addition, environmental attitude (general) and recycling attitudes (specific) have been distinguished on the framework (Tilikidou et al., 2002). Subsequently, Laroche, Negeron, Tomiuk and Barbaro-Forleo (2002) conducted a study to examine the impact of environmental knowledge on environmental attitude and behaviour among consumers in Canada and disconfirmed the hierarchy of environmental knowledge-environmental attitude-environmental behaviour. They reported that the environmental knowledge was not a good predictor of environmental attitude or behaviour among the English Canadian and French-Canadian. Future researchers are suggested to examine the effects of subjective knowledge on environmental attitude rather than objective knowledge.

2.3.4 Relationship between Environmental Knowledge and Environmental Attitude

There is always an assumption in the environmental studies that the increasing levels of environmental knowledge will increase environmental concern and thereby increase green consumption (Oskamp, Harrington, Edwards, Sherwood, Okuda and Swanson, 1991). Arcury (1990) had reported a significant relationship between environmental knowledge and environmental attitude. In addition, Sharifah et al., (2005) conducted a study in Malaysia had indicated that environmental knowledge was significant and correlated positively with environmental attitude. Besides, the knowledge towards the environmental issues was significantly associated with both of environmental concern constructs both in personal and social (Bedrous, 2007). Moreover, a positive correlation between eco-literacy and green purchase attitude was found in Cheah and Phau (2006) as well as Yeoh and Paladino (2007) studies.

2.3.5 Relationship between Environmental Knowledge and Green Purchase Behaviour

Attitude-behaviour studies can be benefited from the examination of factors such as knowledge, motivation or attitude that can influence behaviour (Weigel, 1983). Most educational interventions rely on knowledge transfer as knowledge is a necessary precondition for a person's behaviour (Frick, Kaiser and Wilson, 2004). Consumer knowledge about environmental issues has been identified as a significant predictor of environmental friendly behaviour (Vining and Ebreo, 1990). A meta analysis conducted by Hines et al (1986-1987) have found an average correlation of 0.30 between environmental knowledge and behavior. In addition, Kaiser et al (1999)

environmental knowledge and environmental values explained 40% of the variance of ecological behavioral intention which, in turn, predicted 75% of the variance of general ecological behavior. However, higher environmental knowledge did not guarantee positive environmental behavior (Hwang, Kim and Jeng, 2000).

In the specific green purchases context, Amyx, DeJong, Lin, Chakraborty and Wiener (1994) found that individual who are highly knowledgeable about ecological issues are more willing to pay a premium price for green products. Schelegelmich et al., (1996) constructs three components of environmental consciousness (EK, EA, EB) and reported that higher environmental consciousness displayed by the consumers indicated a higher frequency of green purchases. These three variables explain more than 20% of the variation on the purchasing measures in green purchase decision in general and the specific purchasing habits of five green product categories. The results indicated the perceived environmental knowledge was related to general green purchase behaviour, and buying recycled paper products. In addition, Tilikidou (2001; 2007) had reported that the pro-environmental purchase behaviour was found to be correlated positively with environmental knowledge among the consumers in Greece.

The use of environmental knowledge measures is also far from conclusive. In terms of the measurement scales of environmental knowledge, researchers normally based on the constructs both in subjective and objective knowledge or used either one of the construct in the relevant analysis (Ellen, 1994). A positive and significant relationship between objective knowledge and environmental behaviour such as in the forest activism (McFarlane and Boxall, 2003), recycling behaviour (Ellen, 1994) and green purchase behaviour was found (Tilikidou, 2007). On the other hand, subjective or respondent's perceived knowledge towards the environment has been reported significantly related to environmental concern (Ellen, Wiener and Cobb-Walgren, 1991). It also contributed to the general purchasing behaviour and the behaviour of buying recycled paper products (Schlegelmilch et al., 1996), and related to recycling, source reduction, and political action to reduce waste (Ellen, 1994). Ellen reported that an individual's level of objective knowledge about the environment was not correlated with his or her measures of perceived knowledge. Objective knowledge was predictive only for recycling, whereas the perceived knowledge was an important indicator of recycling, source reduction and political action to reduce waste.

In a recent study conducted to examine the environmentally friendly wine purchase behaviour, Barber, Taylor and Strick (2009) tested both components of environmental knowledge on environmental attitude and reported that the objective environmental knowledge was positively related to the environmental attitude. However, the relationship between perceived environmental knowledge and environmental attitudes was found negative in this study. The inconclusiveness from the abovementioned findings warrants future research. Therefore, the following propositions are put forward:

- P4. If an individual has higher environmental knowledge, he or she will engage in green purchase behaviour.
- P5. If an individual has higher environmental knowledge, he or she will become more concerned about the environmental.
- P6. If an individual has higher environmental knowledge, he or she will have a favourable attitude towards green purchases.

2.4 Threat Perception

Rogers (1975) outlined three components of fear appeal in his Protection Motivation Theory: (a) perceived severity of a threatened event, (b) perceived probability of that threatened event will occur, and (c) perceived efficacy of a protective response or countermeasure. According to Rogers, each component will activate a series of cognitive events, and motivate one's attitudinal and behavioural change. Witte (1992) extended Rogers' work by dividing the concept of perceived threat into two dimensions: perceived susceptibility to the threat (the degree to which one feels at risk for experiencing the threat) and perceived severity of the threat (the magnitude of harm expected from the threat). The perceived threat is a cognitive variable and fear is an emotion variable that involves feeling, they are distinct from each other but they are often correlated (Witte, 1992). In other words, the higher the perceived threat, the greater the fear experienced, and thus, motivates the behavioral change.

The past empirical investigations conducted on the roles of threat perception are more related to the health-related behaviour, such as smoking (Smith and Stutts, 2003); terror threat perception (Goodwin, Wilson and Gaines Jr, 2005), and cancer screening (Jones and Owen, 2006). Researchers suggested that threat perception is an important catalyst that causes a change to happen; it predicts behavioral change in one's life. Subsequently, this concept has also been applied to study the pro-environmental behaviour and the term of "threat perception" refers more than the personal sphere and also encompasses other individuals, living things and entities of the physical environment (Dempsey, 1999). The occurrence of one's concern and actions to save the environment could be due to the perception in one's mind that the environmental situations pose a threat to

health or well-being in life.

2.4.1 Relationship between Environmental Threat, Environmental Attitude, and Green Purchase Behaviour

Baldassare and Katz (1992) examined the influence of perceived environmental threat on environmental behaviour by testing whether individuals who believed that environmental problems would pose a serious threat to their health and well-being, then they would be more likely to recycle, to conserve water, to buy environmentally safe products, and to limit their driving practices. The findings reveal that the threat perceived due to environmental problems is a better indicator to explain all the environmental practices compared to the demographic variables. Subsequently, other researchers have reported the similar findings which have indicated that the perceived environmental threat is an important determinant of pro-environmental behaviours (Axelrod and Lehman, 1993; Johnson and Scicchitano, 2000). In addition, perceived environmental threat is also reported to have a positive and significant correlation with environmental attitudes (Walsh Daneshmandi and MacLachlan, 2000; Pahl, Harris, Todd and Rutter, 2005). Milfont (2007) reported that perceived environmental threat was related to environmental attitude and the impact of threat on environmental behaviour was mediated by environmental attitude. Attitude towards performing a particular environmental behaviour was not tested in this study as the different types of environmental behaviour was measured in an aggregate effect, without dividing them to the different behavioural categories individually. Different types of pro-environmental behaviours should be examined separately as the determinants might have different influence on each specific type of environmental behaviour (Kim and Choi, 2003). Therefore, the following propositions are put forward:

- P7. If an individual believes that the environmental conditions pose a threat to his or her health or well-being, he or she will engage in green purchase behaviour.
- P8. If an individual believes that the environmental conditions pose a threat to his or her health or well-being, he or she will become more concerned about the environment.
- P9. If an individual believes that the environmental conditions pose a threat to his or her health or well-being, he or she will have a favourable attitude towards green purchases.

2.5 Perceived Consumer Effectiveness (PCE)

The concept of perceived consumer effectiveness (PCE) was first described by Kinnear, Taylor and Ahmed (1974) as a measure of an individual belief that he or she can have an effective contribution on pollution abatement. Among the top 10 predictors of environmental concern, PCE was found to be the best predictor and the findings have shown that individual who felt strongly that his individual efforts could be useful in pollution abatement exhibited a higher environmental concern than average. However, the operational measurement of ecological concern used in Kinnear et al., study included both the buyer's ecological concern and purchasing behaviour in an aggregate effect. Subsequently, researches are conducted to extend the investigation on whether PCE would exert an important influence on environmental attitude or concern, pro-environmental behaviour in general, and on different types of individual behaviour. The next section presents the past empirical evidences of PCE related to environmental attitude and behaviour.

2.5.1 Relationship between PCE and Environmental Attitude

Initially, PCE was measured as an element of the personality variables to predict ecological concern (Kinnear et al., 1974) and ecological consumption responsible patterns (Balderjahn, 1988). It can be distinguished from environmental concern and contributes uniquely in predicting certain pro-environmental behaviour (Ellen et al., 1991). In other words, attitude and PCE can be modeled as two distinct constructs in the environmental studies. Attitude can be defined as an evaluation of an individual's beliefs or feeling about an issue, and PCE refers to a self-evaluation in the context of the environmental issue, for instance, pollution abatement (Berger and Corbin, 1992). In terms of the empirical investigation results, PCE was related to environmental attitudes (Kim and Choi, 2003; 2005). People who have exhibited higher PCE are likely to be more environmentally concerned than those who have lower PCE. However, Ellen et al. reported that the interaction between PCE and concern was not significant. As a result, the relationship between PCE and environmental concern is still inconclusive and it warrants further research.

2.5.2 Relationship between PCE and Green Purchase Behaviour

Ellen et al. (1991) warned against the use of PCE to predict generalised pro-environmental behaviour. "If an individual believes that an environmental problem can be solved by a specific activity, then this belief should strongly influence the individual's willingness to engage in that specific activity but not his or her willingness to engage in other pro-environmental actions". This proposition was in line with the suggestions revealed in the past studies that specific attitude measurement should be used to predict the specific pro-environmental behaviour (Vining and Ebreo, 1992). Moreover, PCE is related to the concept of perceived behavioural control proposed in Theory of Planned Behaviour (Ajzen, 1991) by some of the researchers (Ellen et al., 1991; Vermeir

and Verbeke, 2007). It predicts consumer intention as well behaviour directly. For instance, Ellen et al. had reported that PCE was found significant to the purchase of ecologically safe products, recycling, and contribution to environmental groups, but was not a significant factor in the individual's membership in environmental groups and communication with public officials on environmental issues. The results of their findings were consistent with the findings from Balderjahn (1988), who had reported a significant direct linkage between PCE and energy saving, and purchase of non-polluting products, but it was unrelated to home insulation, support for an environmental organisation, and ecologically responsible use of cars.

Furthermore, some of the researchers have investigated the effect of PCE on a combination of wide ranges of pro-environmental behaviours. Straughan and Roberts (1999) found that PCE is a predictor of ecologically conscious consumer behaviour (ECCB) which explained 33 percent of the variation in ECCB. The finding was consistent with the earlier findings of Roberts (1996) as Roberts demonstrated that 32.8 percent of the variance in ECCB could be explained by PCE. It provides the greatest insight of the roles of PCE on ECCB. In both studies, PCE was measured as one of the attitudinal variables in predicting the behaviour and was found to be a better predictor than environmental concern in predicting ECCB. Lee and Holden (1999) have divided the environmental behaviour into high cost and low cost behaviour. PCE was reported to be significantly and positively related to high cost consumer behaviour (as an active member of an environmental group, give money to clean up the environment, write to the government about the environment, and attend a demonstration on environmental issues), but was not related to the low-cost consumer behaviour (seek for the biodegradable products, car pool, avoid environmental harmful packaging, and recycling behaviour).

In addition, Kim (2002) had reported that PCE was a significant predictor of energy saving, green purchase, and recycling behaviour. Kim and Choi (2003) found that PCE had a direct effect only on energy-saving and recycling behaviour, and had an indirect effect on green purchase behaviour via environmental attitudes. Moreover, PCE was found to be directly related to green purchase behaviour (Kim and Choi, 2005). Thus, PCE exerts different impacts on the different types of pro-environmental behaviour and it should not be used to predict generalised pro-environmental behaviour. Webb, Mohr and Harris (2008) had reported that PCE was found to be a key variable associated with socially responsible behaviour. The more the respondents believed that their actions made a difference; the more likely they were to be influenced by corporate social responsibility performance and environmental impact in their purchase and usage decisions and to recycle.

Joonas (2008) conducted a survey among 213 members of environmental organization in the U.S.A to investigate the role of PCE on information search. A significant and positive relationship between PCE and the search for information related to environmentally friendly goods and services was reported, and about 19 percent of the variation in search for information was explained by PCE, while 6 percent accounted for by income. It supported the past findings that PCE is a better predictor than the demographic variables. As a result, consumer marketers need to intensify efforts to strengthen the PCE among consumers to encourage the consumers to search for information on environmentally friendly goods. Therefore, the following propositions are put forward:

- P10. If an individual believe that his or her actions can make a difference in solving the environmental problems, he or she will engage in green purchase behaviour.
- P11. If an individual believes that his or her actions can make a difference in solving the environmental problems, he or she will become concerned about the environment.
- P12. If an individual believes that his or her actions can make a difference in solving the environmental problems, he or she will have a favorable attitude towards green purchases.

2.6 Mediating Roles of Attitude Components

Mediation implies that a causal hypothesis whereby an independent variable (X) causes a mediator (M) which causes a dependent variable (Y) (Holland, 1988; Sobel, 1990). According to Kenny, Kashy and Bolger (1998), mediation effects can be claimed if three conditions are met. First, the independent variable significantly predicts the dependent variable. Second, the independent variable significantly precuts the mediator variable. Third, when the dependent variable is regressed on both the mediator and the independent variable, the mediator significantly predicts the dependent variable, while the predictive utility of the independent variable is reduced. Judd and Kenny (1981) highlighted that if the effect of independent variable (X) on dependent variable (Y) is zero when the mediator is included, it can conclude that there is evidence for full mediation. On the other hand, partial mediation occurs when the effect of X on Y is reduced when the mediator is included. According to MacKinnon (1994), mediation analysis uses the estimates and standard errors from the following regression equations:

$Y = c X + e_1$ The independent variable (X) causes the outcome variable (Y)

$M = a X + e_2$ The independent variable (X) causes the mediator variable (M)

$Y = c' X + bM + e_3$ The mediator (M) causes the outcome variable (Y) when controlling for the independent

variable (X).

The mediating roles of attitude components (i.e. environmental attitude and green purchase attitudes) between EK/ET/PCE and green purchase behaviour have not been tested widely. A specific attitude is better than general environmental attitude in predicting a specific pro-environmental behaviour. Therefore, the following proposition is put forward:

P13. The effects of environmental knowledge/ environmental threat/PCE on green purchase behaviour are mediated by the general and specific attitudinal mediators (i.e. environmental attitude and green purchase attitudes).

3. Future Research

The effects of environmental knowledge, environmental threat and PCE on environmental attitude and behaviour are undeniable. However, the investigation on the causal relationships among these three factors together explain attitudes and behaviour in the context of green purchase behaviour is limited. Based on the previously cited theoretical and empirical literatures, a conceptual model which integrated the effects of environmental knowledge, environmental threat, and PCE on attitudes and behaviour in the context of green purchase behaviour is proposed and shown in Figure 1. Thus, the research objectives of future research are proposed as follows:

- *To identify the prominent predictors that will most likely influence green purchase behaviour.* In this situation, factors such as environmental knowledge, environmental threat, PCE, environmental attitude and green purchase attitudes will serve as the independent variables, and green purchase behaviour will serve as the dependent variable.
- *To examine the relationship between general environmental attitude and green purchase attitudes.* Rather than isolating them or test their effects on green purchase behaviour separately, a more complete understanding of attitude is expected to derive from considering and clarifying both type of attitudes in one study (Eagly and Chaiken, 1998). Exploratory factor analysis, which is a data-reduction technique to reduce a large number of overlapping measured variables to a much smaller set of factors (Green and Salkind, 2008) will be conducted on the measurement items of the beliefs and attitudes of respondents about the importance of green purchases, inconvenience of green purchases, compromises of green purchases, and confidence of green purchases to suit the context of green purchase behaviour in Malaysia. It enables the firms to understand which type of attitudes will lead to green purchase behaviour and allows a comprehensive profiling and positioning strategies to be incorporated in their business operations. It is important to understand green consumers and their characteristics to enable firms to develop a new segmentation, targeting and positioning strategies (D'Souza et al., 2007). Firms must first segment the market and then targets the green consumers from the market segment in order to position their green products more effectively, rather than mass marketing the products (Schlegelmilch et al., 1996).
- *To investigate to what extent the indirect factors (environmental knowledge, environmental threat, PCE) relate to the respective direct factors (general environmental attitude and green purchase attitudes) as well as their ability to explain green purchase behaviour.* This aims to examine the mediating effect of attitudinal components (i.e. environmental attitude and green purchase attitude) between the three independent variables (environmental knowledge, environmental threat, PCE) and dependent variable (green purchase behaviour). The arguments on the predicting power of general environmental attitude as compared to the specific green purchase attitudes can be tested and confirmed through the combination of both types of attitudes in an empirical research.
- *To propose a structural research model that integrated the effects of environmental knowledge, environmental threat, and PCE on attitudes and behaviour in the context of green purchase behaviour.* The lack of causal or path analysis conducted in previous environmental researches had limited the researchers to explore the processes of influences of variables on others, and the direct and indirect effects of all variables simultaneously on the behavioural outcomes. This objective aims to minimise the previous research limitations and enable the researcher to determine a best fit model to be used to understand the determinants of green purchase behaviour in Malaysia.

4. Conclusion

The nature and motivations of green purchase behaviour are different compared to the general purchase related behaviour. Firms need to decide on the feasibility of entering or expanding operations in the green markets, they require guidance on how to position its green products to the appropriate target market in order to create a better customer value, while preserving the environment. Hence, to motivate the behavioural change of consumers to shift from buying conventional products to environmentally friendly products, advertising messages need to be convincing enough to arouse the green purchase actions and commitment. The arguments on the predicting

power of attitudinal components (general and specific) on green purchase behaviour are expected to be resolved. Fear arousals such as the danger and threat of environmental deterioration on the health and well-being, the perceived knowledge on the environmental issues or problems, and the perceived effectiveness of the individual actions in solving the environmental problems are believed to be effective in promoting the favorable attitudes and sustainable consumption behaviour, thus leading to a better environmental quality.

References

- Aini, M.S., Nurizan, Y., and Fakhru'l-Razi, A. (2007). Environmental Comprehension and Participation of Malaysian Secondary School Students. *Environmental Education Research*, 13(1), 17-31. <http://dx.doi.org/10.1080/13504620601122616>
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behaviour and Human Decision Processes*, 50, 179-211. [http://dx.doi.org/10.1016/0749-5978\(91\)90020-T](http://dx.doi.org/10.1016/0749-5978(91)90020-T)
- Ajzen, I., & Fishbein, M. (1977). Attitude-Behaviour Relations: A Theoretical Analysis and Review of Empirical Research. *Psychological Bulletin*, 84, 888-918. <http://dx.doi.org/10.1037/0033-2909.84.5.888>
- Amyx, D.A., DeJong, P.F., Lin, Chakraborty, G., & Wiener, J.L. (1994). Influencers of Purchase Intentions for Ecologically Safe Products: An Exploratory Study. *Marketing Theory and Applications, Proceedings on the 1994 AMA Winter Educators Conference*, 341-347.
- Aoyagi-Usui, M. (2001). How Individual Values Affect Green Consumer Behaviour? Results from a Japanese Survey. *Global Eniron, Res*, 5(1), 97-105.
- Arcury, T.A. (1990). Environmental Attitude and Environmental Knowledge. *Human Organization*, 49, 300-304.
- Axelrod, L.J., & Lehman, D.R. (1993). Responding to Environmental Concerns: What Factors Guide Individual Action?. *Journal of Environmental Psychology*, 13, 149- 159. [http://dx.doi.org/10.1016/S0272-4944\(05\)80147-1](http://dx.doi.org/10.1016/S0272-4944(05)80147-1)
- Baldassare, M., & Katz, C. (1992). The Personal Threat of Environmental Problems as Predictor of Environmental Practices. *Environment and Behaviour*, 24, 602-616. <http://dx.doi.org/10.1177/0013916592245002>
- Balderjahn, I. (1988). Personality Variables and Environmental attitudes as Predictors of Ecologically Responsible Consumption Patterns. *Journal of Business Research*, 17, 51-56. [http://dx.doi.org/10.1016/0148-2963\(88\)90022-7](http://dx.doi.org/10.1016/0148-2963(88)90022-7)
- Bamberg, S. (2003). How Does Environmental Concern Influence Specific Environmentally Related Behaviours? A New Answer to an Old Question. *Journal of Environmental Psychology*, 23, 21-32. [http://dx.doi.org/10.1016/S0272-4944\(02\)00078-6](http://dx.doi.org/10.1016/S0272-4944(02)00078-6)
- Barber, N., Taylor, C., & Strick, S. (2009). Wine Consumers' Environmental Knowledge and attitudes: Influence on Willingness to Purchase. *International Journal of Wine Research*, 1, 59-72. <http://dx.doi.org/10.2147/IJWR.S4649>
- Bedrous, A.V. (2007). Environmental Concern and Pro-environmental Behaviours: The Relationship Attitudes, Behaviours, and Knowledge. Department of Sociology, University of Nebraska-Lincoln.
- Berger, I.E., & Corbin, R.M. (1992). Perceived Consumer Effectiveness and Faith in others as Moderators of Environmentally Responsible Behaviours. *Journal of Public Policy and Marketing*, 11, 79-89.
- Blackwell R.D., Miniard, P.W., & Engel, J.F. (2001). *Consumer Behaviour*. (9th ed.). New York: Harcourt College Publishers.
- Brucks, M. (1985). The Effects of Product Class Knowledge on Information Search Behaviour. *Journal of Consumer Research*, 12 (June), 1-16. <http://dx.doi.org/10.1086/209031>
- Chan, R.Y.K. (2001). Determinants of Chinese Consumers' Green Purchase Behaviour. *Psychology & Marketing*, 18 (4), 389-413. <http://dx.doi.org/10.1002/mar.1013>
- Chan, T.S. (1996). Concerns for Environmental Issues and Consumer Purchase Preferences: A Two-country Study. *Journal of International Consumer Marketing*, 9, 43-55. http://dx.doi.org/10.1300/J046v09n01_04
- Cheah, I., & I. Phau. (2006). Interpersonal Influence, Value Orientation and Product Necessity on Purchase of Environmentally Friendly Products. In Proceedings of *Australian and New Zealand Marketing Academy conference*.
- Copeland, M. T. (1923). Relation of Consumers' Buying Habits to Marketing Methods. *Harvard Business Review*, 1 (April), 282-89.

- Dodd, T.H., Laverie, D.A., Wilcox, J.F., & Duhan, D.F. (2005). Differential Effects of Experience, Subjective Knowledge, and Objective Knowledge on Sources of Information used in Consumer Wine Purchasing. *Journal of Hospitality and Tourism Research*, 29 (1), 3-19. <http://dx.doi.org/10.1177/1096348004267518>
- Dunlap, R.E., & Jones, R.E. (2002). Environmental Concern: Conceptual and Measurement Issues. In: R.E. Dunlap and W. Michelson, Editors, *Handbook of Environmental Sociology*. Greenwood Press, Westport, CT, pp. 482-524 (Chapter 15).
- Dunlap, R.E., & Van Liere, K. (1978). The "New Environmental Paradigm": A Proposed Measuring Instrument and Preliminary Results. *Journal of Environmental Education*, 9, 10-18.
- Dunlap, R.E., Van Liere, K.D., Mertig, A.G., & Jones, R.E. (2000). Measuring Endorsement of the New Ecological Paradigm: A revised NEP Scale. *Journal of Social Issues*, 56(3), 425-442. <http://dx.doi.org/10.1111/0022-4537.00176>
- Eagly, A., & Chaiken, S. (1993). *The Psychology of Attitudes*. New York: Harcourt Brace Jovanovich.
- Ellen, P.M. (1994). Do We Know What We Need to Know? Objective and Subjective Knowledge Effects on Pro-ecological Behaviours. *Journal of Business Research*, 30(1), 43-52. [http://dx.doi.org/10.1016/0148-2963\(94\)90067-1](http://dx.doi.org/10.1016/0148-2963(94)90067-1)
- Ellen, P.M., Wiener, J.L., & Cobb-Walgren, C. (1991). The Role of Perceived Consumer Effectiveness in Motivating Environmentally Conscious Behaviours. *Journal of Public Policy and Marketing*, 10, 102-117.
- Fishbein, M., & Ajzen, I. (1975). *Belief, Attitude, Intentions, and Behaviour: An Introduction of Theory and Research*. Reading, MA: Addison-Wesley.
- Fransson, N., & Garling, G. (1999). Environmental Concern: Conceptual Definitions, Measurement Methods, and Research Findings. *Journal of environmental psychology*, 19, 369-382. <http://dx.doi.org/10.1006/jevp.1999.0141>
- Frick, J., Kaiser, F. G., & Wilson, M. (2004). Environmental Knowledge and Conservation Behaviour: Exploring Prevalence and Structure in a Representative Sample. *Personality and Individual Differences*, 37, 1597-1613. <http://dx.doi.org/10.1016/j.paid.2004.02.015>
- Goodwin, R., Wilson, M., & Gaines Jr, S. (2005). Terror Threat Perception and its Consequences in Contemporary Britain. *British Journal of Psychology*, 96, 389-406. <http://dx.doi.org/10.1348/000712605X62786>
- Grunert, S.C., & Juhl, H.J. (1995). Values, Environmental Attitudes, and Buying of Organic Foods. *Journal of Economic Psychology*, 16, 39-62. [http://dx.doi.org/10.1016/0167-4870\(94\)00034-8](http://dx.doi.org/10.1016/0167-4870(94)00034-8)
- Haron, S.A., Paim, L., & Yahaya, N. (2005). Towards Sustainable Consumption: An Examination of Environmental Knowledge among Malaysians. *International Journal of Consumers Studies*, 29(5), 426-436. <http://dx.doi.org/10.1111/j.1470-6431.2005.00460.x>
- Hines, J.M., Hungerford, H.R., & Tomera, A.N. (1987). Analysis and Synthesis of Research on Responsible Environmental Behaviour: A Meta-analysis. *Journal of Environmental Education*, 18, 1-8, Winter. <http://dx.doi.org/10.1080/00958964.1987.9943482>
- Hovland, C., & Rosenberg, M. (1960). *Attitude Organisation and Change*. New Haven, CT: Yale University Press.
- Hu, C.M. (2007). The Role of Confidence and Compromise in Stimulating Consumers' Purchase Intentions toward Green Products. Unpublished Master Thesis, Institute of International Business
- Hwang, Y.H., Kim, S. I., & Jeng, J.M. (2000). Examining the Causal Relationships among Selected Antecedents of Responsible Environmental Behaviour. *The journal of environmental education*, 31(4). pp. 19-25. <http://dx.doi.org/10.1080/00958960009598647>
- Johnson, R.J., & Scicchitano, M.J. (2000). Uncertainty, Risk, Trust, and Information: Public Perceptions of Environmental Issues and Willingness to Take Action. *Policy Studies Journal*, 28, 633-647. <http://dx.doi.org/10.1111/j.1541-0072.2000.tb02052.x>
- Joonas, K. (2008). Environmentally Friendly Products: Factors Affecting Search for Information. *AIMS International Journal of Management*, 2(3), 165-176.
- Kalafatis, S.P., Pollard, M., East, R., & Tsogas, M.H. (1999). Green Marketing and Ajzen's Theory of Planned Behaviour: A Cross-market Examination. *Journal of Consumer Marketing*, 16, 441-460. <http://dx.doi.org/10.1108/07363769910289550>
- Kim, Y. (2002). *The Impact of Personal Value Structures on Consumer Pro-environmental Attitudes, Behaviours and Consumerism: A cross-cultural Study*. Doctoral Dissertation, College of Communication Arts and Sciences,

Michigan State University.

- Kim, Y., & Choi, S. (2003). Antecedents of Pro-environmental Behaviours: An Examination of Cultural Values, Self-efficacy, and Environmental Attitudes. *International Communication Association*, CA [Online] Available: http://www.allacademic.com/meta/p111527_index.html.
- Kim, Y., & Choi, S.M. (2005). Antecedents of Green Purchase Behaviour: An Examination of Collectivism, Environmental Concern and PCE. *Advances in Consumer Research*, 32, 592-59
- Kinner, T.C., Taylor, J.R., & Ahmed, S.A. (1974). Ecologically Concerned Consumers: Who are they? *Journal of Marketing*, 11, 20-24. <http://dx.doi.org/10.2307/1250192>
- Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why Do People Act Environmentally and What are the Barriers to Pro-environmental behaviour? *Environmental Education Research*, 8(3), 239-260. <http://dx.doi.org/10.1080/13504620220145401>
- Laroche, M., Bergero, J., & Barbarot-Forleo, G. (2001). Targeting Consumers Who are Willing to Pay More for Environmentally Friendly Products. *Journal of Consumer Market*, 18, 503-520. <http://dx.doi.org/10.1108/EUM0000000006155>
- Laroche, M., Tomiuk, M., Bergeron, J., & Barbaro-Forleo., G. (2002). Cultural Differences in Environmental Knowledge, Attitudes, and Behaviours of Canadian Consumers. *Canadian Journal of Administrative Science*, 19(3), 267-283. <http://dx.doi.org/10.1111/j.1936-4490.2002.tb00272.x>
- Lavidge, R.J., & Steiner, G.A. (1961). A Model for Predictive Measurements of Advertising Effectiveness. *Journal of Marketing*, 25(6), 59-62. <http://dx.doi.org/10.2307/1248516>
- Lee, J.A., & Holden, S.J.S. (1999). Understanding the Determinants of Environmentally Conscious Behaviour. *Psychology and Marketing*, 16(5), 373-392. [http://dx.doi.org/10.1002/\(SICI\)1520-6793\(199908\)16:5<373::AID-MAR1>3.0.CO;2-S](http://dx.doi.org/10.1002/(SICI)1520-6793(199908)16:5<373::AID-MAR1>3.0.CO;2-S)
- Mainieri, T., Barnett, E., Valdero, T., Unipan, J., & Oskamp, S. (1997). Green Buying: The Influence of Environmental Concern on Consumer Behaviour. *Journal of Social Psychology*, 137(2), 189-204. <http://dx.doi.org/10.1080/00224549709595430>
- Majlath, M. (2008). What are the Main Psychographic Differences between Persons Behave in an Environmentally Friendly Way and Those Who Do Not? *MEB 2008- 6th International Conference on Management Enterprise and Benchmarking*, Budapest, Hungary.
- Maloney, M. P., Ward, M. P., & Braucht, G. N. (1975). Psychology in Action: A Revised Scale for the Measurement of Ecological Attitudes and Knowledge. *American Psychologist*, 30, 787-790. <http://dx.doi.org/10.1037/h0084394>
- McCarty, J.A., & Shrum, L.J. (1994). The Recycling of Solid Wastes: Personal and Cultural Values and Attitudes about Recycling as Antecedents of Recycling Behaviour. *Journal of Business Research*, 30, 53-62. [http://dx.doi.org/10.1016/0148-2963\(94\)90068-X](http://dx.doi.org/10.1016/0148-2963(94)90068-X)
- McCarty, J.A., & Shrum, L.J. (2001). The Influence of Individualism, Collectivism, and Locus of Control on Environmental Beliefs and Behaviour. *Journal of Public Policy & Marketing*, 20(1), 93-104. <http://dx.doi.org/10.1509/jppm.20.1.93.17291>
- McFarlane, B.L., & Boxall, P.C. (2003). The Role of Social Psychological and Social Structural Variables in Environmental Activism: An Example of the Forest Sector. *Journal of Environmental Psychology*, 23, 79-87. [http://dx.doi.org/10.1016/S0272-4944\(02\)00080-4](http://dx.doi.org/10.1016/S0272-4944(02)00080-4)
- Milfont, T. L. (2007). *Psychology of Environmental Attitudes: A Cross-cultural Study of their Content and Structure*. Unpublished doctoral dissertation, University of Auckland, Auckland, New Zealand.
- Mostafa, M.M. (2007). Gender Differences in Egyptian Consumers' Green Purchase Behaviour: The Effects of Environmental Knowledge, Concern and Attitude. *International Journal of Consumer Studies*, 31, 220-229. <http://dx.doi.org/10.1111/j.1470-6431.2006.00523.x>
- Ng, Y.L. (2009). *Environmentally Friendly Products and Malaysian Consumers*. Master of Business Administration, University of Malaya.
- Nordlund, A.M., & Garvill, J. (2002). Value Structures behind Pro-environmental Behaviour. *Environmental and behaviour*, 34; 740-755. <http://dx.doi.org/10.1177/001391602237244>
- Pahl, S., Harris, P. R., Todd, H. A., & Rutter, D. R. (2005). Comparative Optimism for Environmental Risks. *Journal of Environmental Psychology*, 25, 1-11. <http://dx.doi.org/10.1016/j.jenvp.2004.12.004>
- Peattie, K. (2001). Golden Goose or Wild Goose? The Hunt for the Green Consumer. *Business Strategy and the*

Environment, 10, 187-199. <http://dx.doi.org/10.1002/bse.292>

Roberts, J.A. (1996). Green Consumers in the 1990s: Profile and Implications for Advertising. *Journal of Business Research*, 36, 217-231. [http://dx.doi.org/10.1016/0148-2963\(95\)00150-6](http://dx.doi.org/10.1016/0148-2963(95)00150-6)

Roberts, J.A., & Bacon, D.R. (1997). Exploring the Subtle Relationships between Environmental Concern and Ecologically Conscious Consumer Behaviour. *Journal of Business Research*, 40(1), 79-89. [http://dx.doi.org/10.1016/S0148-2963\(96\)00280-9](http://dx.doi.org/10.1016/S0148-2963(96)00280-9)

Rogers, R. W. (1975). A Protection Motivation Theory of Fear Appeals and Attitude Change. *The Journal of Psychology*, 91, 93-114. <http://dx.doi.org/10.1080/00223980.1975.9915803>

Rolston, C.P., & Di Benedetto, C.A. (1994). Developing a Greenness Scale: An Exploration of Behaviour versus Attitude, in Park, C.W. (Eds), *AMA Winter Educators' Conference Proceedings*, American Marketing Association, Chicago, IL 5, 335-40.

Schahn, J., & Holzer, E. (1990). Studies of Individual Environmental Concern: The Role of Knowledge, Gender, and Background variables. *Environment and Behaviour*, 22(6), 767-786. <http://dx.doi.org/10.1177/0013916590226003>

Schlegelmilch, B.B., Bohlen, G.M., & Diamantopoulos, A. (1996). The Link between Green Purchasing Decisions and Measures of Environmental Consciousness. *European Journal of Marketing*, 30(5). Pp. 35-55. <http://dx.doi.org/10.1108/03090569610118740>

Schultz, P.W., & Oskamp, S. (1996). Effort as a Moderator of the Attitude-behaviour Relationship. *Social Psychology Quarterly*, 59, 375-383. <http://dx.doi.org/10.2307/2787078>

Schultz, P.W., & Zelezny, L. C. (1999). Values as Predictors of Environmental Attitudes: Evidence for Consistency across 14 Countries. *Journal of Environmental Psychology*, 19, 255-265. <http://dx.doi.org/10.1006/jevps.1999.0129>

Shamdasani, P., Chon-Lin, G., & Richmond, D. (1993). Exploring Green Consumers in an Oriental Culture: Role of Personal and Marketing Mix. *Advances in consumer research*, 20, 488-493.

Shrum, L.J., McCarty, J.A., & Lowrey, T.M. (1995). Buyer Characteristics of the Green Consumer and Their Implications for Advertising Strategy. *Journal of Advertising*, 24(2), 71-76.

Smith, K.H., & Stutts, M.A. (2003). Effects of Short-term Cosmetic versus Long Term Health Fear Appeals in Anti-smoking Advertisements on the Smoking Behaviour of Adolescents. *Journal of Consumer Behaviour*, 3(2), 157-165. <http://dx.doi.org/10.1002/cb.130>

Soontonsmai, V. (2001). Predicting Intention and Behaviour to Purchase Environmentally Sound or Green Products among Thai Consumers: An Application of the Theory of Reasoned Action. Thesis of Doctor of Philosophy, Nova Southeastern University.

Straughan, R.D., & Roberts, J.A. (1999). Environmental Segmentation Alternatives: A Look at Green Consumer Behaviour in the New Millennium. *Journal of Consumer Marketing*, 16(6), 558-75. <http://dx.doi.org/10.1108/07363769910297506>

Sun, J., & Wilson, V.L. (2008). Assessing General and Specific Attitudes in Human Learning Behaviour: An Activity Perspective and A Multilevel Modeling Approach. *Educational and Psychological Measurement*, 66, 245-261.

Tanner, C., & Kast, S.W. (2003). Promoting Sustainable Consumption: Determinants of Green Purchases by Swiss Consumers. *Psychology & Marketing*, 20(10), 883-902. <http://dx.doi.org/10.1002/mar.10101>

Tarkiainen, A., & Sundqvist, S. (2005). Subjective Norms, Attitudes and Intentions of Finnish Consumers in Buying Organic Food. *British Food Journal*, 107(11), 808-822. <http://dx.doi.org/10.1108/00070700510629760>

Thapa. B. (1999). Environmentalism: The Relation of Environmental Attitudes and Environmentally Responsible Behaviours among Undergraduate Students. *Bulletin of Science, Technology and Society*, 19(5), 426-438. <http://dx.doi.org/10.1177/027046769901900512>

Tilikidou, I. (2007). The Effects of Knowledge and Attitudes upon Greeks' Pro-environmental Purchasing Behaviour. *Corporate Social Responsibility and Environmental Management*, 14, 121-134. <http://dx.doi.org/10.1002/csr.123>

Tilikidou, I., Adamson, I., & Sarmaniotis, C. (2002). The Measurement Instrument of Ecologically Conscious Consumer Behaviour. *MEDIT*, 1(4), 46-53.

Tsen, C.H., Phang, G., Haslinda, H., & Merlyn Rita, B. (2006). Going Green: A Study of Consumers' Willingness to Pay for Green Products in Kota Kinabalu. *International Journal of Business and Society*.

Vermeir, I., & Verbeke, W. (2007). Sustainable Food Consumption among Young Adults in Belgium: Theory of Planned Behaviour and the Role of Confidence and Values. *Ecological Economics*, 64(3), 542-552. <http://dx.doi.org/10.1016/j.ecolecon.2007.03.007>

Vining, J., & Ebreo, A. (1992). Predicting Recycling Behaviour from Global and Specific Environmental attitudes and Changes in Recycling Opportunities. *Journal of Applied Social Psychology*, 22, 1580-1607. <http://dx.doi.org/10.1111/j.1559-1816.1992.tb01758.x>

Webb, D.J., Mohr, L.A., & Harris, K.E. (2008). A Re-examination of Socially Responsible Consumption and its Measurement. *Journal of Business Research*, 61, 91-98. <http://dx.doi.org/10.1016/j.jbusres.2007.05.007>

Weigel, R. H., and Weigel., J. (1978). Environmental Concern: The Development of a Measure. *Environment and Behaviour*, 10(1), 3-16. <http://dx.doi.org/10.1177/0013916578101001>

Weigel, R.H. (1983). Environmental Attitudes and Prediction of Behaviour. In N.R. Feimer and E.S. Geller (Eds). *Environmental Psychology: Directions and Perspectives*. New York, Praeger.

Witte, K. (1992). Putting the Fear Back into Fear Appeals: The Extended Parallel Process Model. *Comm Monographs*, 59, 329-349. <http://dx.doi.org/10.1080/03637759209376276>

Yeoh, M., & Paladino, A. (2007). Analysing the Effects of Prestige on Environmental Attitudes and Behaviours upon Low-involvement Purchases: Does Branding Matter? *Australian and New Zealand Marketing Academy (ANZMAC) Conference 2007*, 2066-2074.

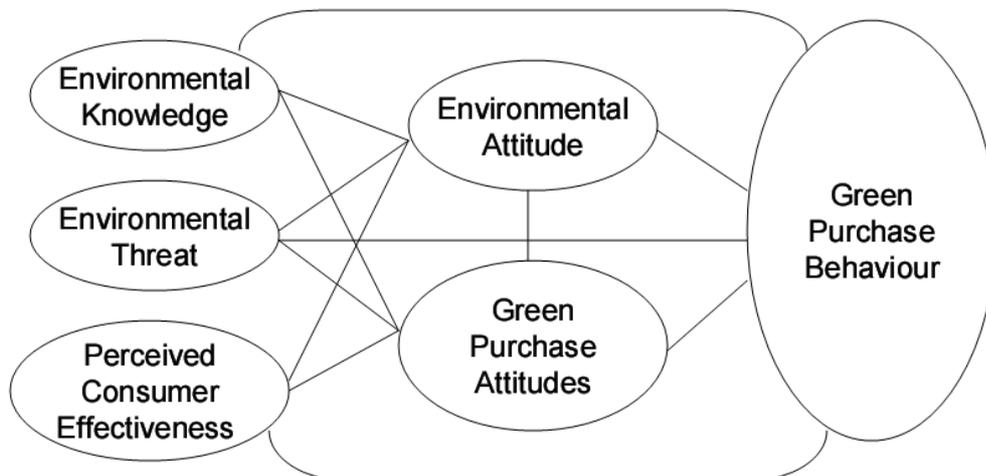


Figure 1. A conceptual model that integrated the effects of environmental knowledge, environmental threat, and perceived consumer effectiveness to explain attitudes and behaviour in the context of green purchase behaviour