

**AN EXAMINATION OF ENVIRONMENTAL ORIENTATION OF  
CONSUMERS IN MALAYSIA**

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## **Dedication**

To my wife, Wai Yee and children, Ze Hong and Bi Qi, with love.

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## **ABSTRAK**

Walaupun banyak usaha telah dilaksanakan dengan matlamat untuk mempertingkatkan keprihatian terhadap alam sekitar, dan mengubah sikap orang awam, contohnya program pendidikan, pengubalan undang-undang, kempen kitar semula, kempen-kempen mencegah pencemaran alam sekitar dan kualiti alam sekitar dan sebagainya, namun keputusan kurang memuaskan. Dengan tujuan memberi keterangan terhadap isu-isu tersebut di atas, penyelidikan ini mengkaji orientasi persekitaran pengguna-pengguna di Malaysia. Satu rangka kerja teori telah dibentuk untuk menguji hubungan di antara keprihatian terhadap alam sekitar, niat dan perlakuan terhadap alam sekitar. Terdapat lima pembolehubah dalam model yang dicadangkan – pengetahuan terhadap alam sekitar, kepercayaan terhadap alam sekitar, keberkesanan kempen pro-alam sekitar, niat terhadap alam sekitar dan keperlakuan terhadap alam sekitar. Tiga belas hipotesis telah diuji dengan 151 responden diterima dari orang awam. Didapati tahap orientasi pengguna-pengguna di Malaysia adalah sederhana. Kepercayaan terhadap alam sekitar mempunyai kesan positif kepada niat terhadap alam sekitar, dan seterusnya mempunyai kesan positif kepada keperlakuan terhadap alam sekitar. Akan tetapi, pengetahuan terhadap alam sekitar didapati tidak mempunyai hubungan yang signifikan dengan samada niat atau keperlakuan terhadap alam sekitar. Tambahan pula, keberkesanan kempen pro-alam sekitar tidak mempunyai kesan pemoderat terhadap perhubungan di antara niat dan keperlakuan terhadap alam sekitar. Model penyelidikan yang telah dibentuk oleh pengkaji adalah dianggap bersesuaian untuk mengkaji orientasi alam sekitar pengguna-pengguna.

## **ABSTRACT**

Despite many efforts have been formulated with the intention to improve environmental concern and change attitude of the public. e.g. education programs, enactment of legislations, recycling campaigns, pollution prevention programs, etc., mixed results have been achieved as to the effectiveness of the above efforts. In order to furnish insight into the above issues, this research studied the environmental orientation of consumers in Malaysia. Then, a theoretical framework was developed to test the relationship between environmental concern, intention and behavior of consumers. There were five environmental variables in the proposed model – environmental knowledge, belief, the perceived effectiveness of pro-environmental program, environmental intention and behavior. Thirteen hypotheses were tested with 151 respondents received from the public. It was found that the level of environmental orientation of consumers in Malaysia is moderately good. Environmental belief has positive effect on environmental intention, and in turn has positive effect on environmental behavior. However, environmental knowledge was found to have no significant relationship with environmental intention or behavior. On top of that, the perceived effectiveness of pro-environmental campaigns has no moderating effect on the relationship between environmental concern and behavior. The research model developed by the researcher for this study is considered appropriate for examining environmental orientation of consumers.

## Chapter 1

### INTRODUCTION

#### 1.1 Introduction

Since Industrial Revolution (1750s), the proliferation of industrial and manufacturing activities have caused much environmental and ecological degradation. Among the environmental problems which capture attentions of the authorities are global warming, pollution, depletion of the Earth's stocks of non-renewable resources (mineral and fossil fuel), depletion of renewable resources (fish, animal, forest, and fresh water), soil erosion, and release of toxic waste. In broad term, the impacts of human activity on the environment are proportional to population levels times per capital level of consumption. Population levels combined with consumption gives rise to three groups of impacts that cause damage to natural resources stocks through:

- (a) Overuse;
- (b) The generation of pollution and wastes; and
- (c) Alteration, as a result of land-used change, or ecosystem change (e.g., caused by intensive inputs of agrochemicals).

All of these environmental impacts also affect human health and the environment.

Much has been written about the rapid deterioration of the world's ecosystems by researchers and environmentalists. Evidence suggests that a growing number of general public in the US and Western Europe are becoming more environmentally responsible in terms of their social value and life-style (Taylor, Hutchinson, Pollack & Tapper, 1994). Beginning in the early 1960s, public awareness and concern about the natural environment grew rapidly. It peaked during the early 1970s and declined

moderately through the early 1980s (Benton, 1994). By 1990, public awareness of environmental problems and support for environmental protection was at all time high (Dunlap & Scarce, 1991).

Willums, J-O of World Industry Council for the Environment (as cited in Taylor et al., 1994) reported that, in 1992, United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro, drew worldwide attention to the challenges of managing our environment properly. Governments were asked to commit to a wide scope of action and initiatives, and industry was called on as a key instrument in moving sustainable development. In tandem with that, business was actively involved in the UNCED process, and the participation of business leaders from many countries helped policy makers to understand more clearly what role industry does play today, and what role it could play in the future, given the right policy framework. This is an important milestone in the green movement.

### **Sustainable Development**

Taylor et al. (1994) mentioned that, as part of the effort to encounter environmental problems, the United Nations Conference on Environment and Development (UNCED) put the spotlight on environmental issues and the need to achieve ‘sustainable development’. According to UNCED, sustainable development is about altering the way we use resources – about changing both our production and consumption patterns that are more environmentally sound. Sustainable development involves four key components:

- (a) Integrating the environment and the economy;
- (b) Long-term planning;

- (c) Equitable sharing of resources throughout the world; and
- (d) Protecting environment assets.

### **Solid Wastes in Malaysia**

The problems of environmental pollution and disposal of solid and liquid wastes are getting serious due to industrialization and increase of population. According to Maseri (2005), plastics have doubled since the last decade, when they constituted only 5% of the total volume of garbage produced. An average annual generation rate increase of 4% is predicted (2.5% attributed to population increase, 1.5% due to increase of waste production per capita). Kuala Lumpur and Selangor produced 7,922 tons/day of wastes in 2000, and this will increase to 11,728 tons/day in 2010. For the states of Negeri Sembilan, Melaka and Johor, wastes generated for 2000 were 2633 tons/day, and 3539 tons/day are expected by 2015. It has been estimated that an average Klang Valley resident produced 1.56kg of garbage every day in 1998, enough to fill all 88 floors of the Petronas Twin Towers in nine days.

The generation of solid wastes presents challenges to solid waste managers and town and country planners, due to lack of available landfill space.

### **Landfills**

After collection, most wastes are transported to landfills. There are 230 official dumping sites in Malaysia, the majority of which are crude landfills, with only 10% providing leachate treatment ponds and gas ventilation systems (Zaman, 1992), so they are leaching chemicals into the groundwater, poisoning the air with toxic gases and generally being health hazards. In almost all landfills, there are sorting activities by scavengers for cardboard, plastics, bottles and metals; and the remaining

pile is leveled by bulldozers. At the end of the day, the pile is supposed to be covered by a layer of soil and compacted to reduce infestation by vermin (flies, rats, birds), fire and odor problems. However, this is frequently not done, which may cause health problems to the public.

## **Recycling**

About half of the garbage generated from households is recyclable, including about 30% from newspapers and waste paper. Nationally, 43,000 tons of plastics, 57,000 tons of paper and 8,000 tons of glass are discarded every month, and all of these are recyclable. Recycling in Malaysia has not been extensively explored, and recycling activities hardly make a dent in reducing the total volume of wastes generated: a THT/UPM (1994) survey indicated that recycling recovered only 0.0063% to 3.74% of the total recyclable potential in solid wastes.

**Table 1.1**

*Waste Composition of Selected Cities/Towns in Malaysia (in % )*

Area	Organics	Paper	Plastics	Metals	Others
Kuala Lumpur(Urban)	48.4	30.0	9.8	4.6	7.2
Seremban (Semi-Urban)	35.0	10.0	2.5	5.0	25.0
Muar (Rural)	63.7	11.7	7.0	6.4	11.2

Source: THT/UPM survey on local governments 1994, as quoted in LESTARI, 1998.

Solid waste management is a major challenge for municipal and local authorities, constituting some 40 to 70% of their operating budgets. For example, in 1998, the Petaling Jaya Municipal Council spent RM1.8 million a month for waste



management, constituted 40% of its operating budget. With the volume increasing, solid waste management merits urgent attention.

Dato' Seri Ong Ka Ting (2004) mentioned that the government is playing a significant part in creating awareness for the recycling effort. The National Recycling Program which was initiated by placing bins at suitable, publicly accessible sites such as residential areas, community halls and offices, was implemented in year 2000. The Ministry of Housing and Local Government has extended the recycling infrastructure by creating collection centers of recyclables at public places especially in residential areas. A long-term target to recycle at least 22 percent of wastes by the year of 2020 was also set. Three years after the implementation of the program, we have achieved a modest rate of 3 percent, a figure which was much lower than 44 percent, as achieved by the developed countries. The acute need to recycle has also been voiced by our Prime Minister, Datuk Seri Abdullah Ahmad Badawi, who has urged all government agencies to practice recycling. By recycling, the government can save up to RM 88 million a year if the projected 22 percent rate is achieved. Waste management itself cost the government RM 400 million last year. It is estimated that 40-70 percent of the taxes collected by the Ministry goes towards managing the five million tones of wastes produced by Malaysians each year. This pointed to the need for all of us to even work harder and work together to achieve the target.

According to Poosparajah from the Star (20/03/2005), electronic products, if not disposed or recycled properly, can become harmful to our health and even dangerous due to the elements used in them. Reusing recycled computers prevents them from ending up in landfills. Donating usable computers to charities and other organizations also cuts the amount of electronic wastes reaching landfills. Unfortunately, in Malaysia, recycling awareness is still painfully low.

However, in Malaysia, the problem about reducing waste may also be due to the fact that recycling bins are not easily accessible. In many areas, the stuffs collected in these bins are often not collected by the authority in-charged, and the people do not know who to contact to complain about this sort of problem (Chang, 2004).

## **1.2 Problem Statement**

As had been explained earlier, the recent rapid development of economic activities in Malaysia has caused much environmental degradation. As experienced by most industrialized nations, Malaysia has been paying a high ecological price for her rapid economic growth in terms of accelerating pollution and depletion of many critical resources. As a result, Malaysia is facing land-pollution, air pollution and water pollution (Thinkquest, 2006).

### **Land Pollution**

Agriculture still plays a very important role in the development of Malaysia and a lot of emphasis has been laid on it. Too much perhaps, the wildlife has been placed in danger.

In Cameron Highlands, in the state of Pahang, famous for vegetables as well as tea, human activity has taken its toll on the fragile environment. Large scale farming has caused thousands of acres of forest land to be ploughed up and the habitat of wildlife has been destroyed. Consequently, wildlife has fled or migrated to escape the dangers and activities of humans. Unknown to them, they have caused an imbalance in their ecosystem, making some areas too densely populated with predators and not enough food to go around.

Pesticides used in agriculture also play a main role in the degradation of the environment. Many of these pesticides contain non biological ingredients and can cause abnormal changes in any wildlife that comes across them. Not only insects to which the pesticides are aimed towards are affected, but also the animals which feed on them, and eventually humans.

Pesticides pollute the Earth, making it useless as well as poisonous after all the nutrients have been sapped out from it. Pesticides also flow into the rivers and streams and eventually seas, causing pollution as it continues its seaward journey.

Pesticides, if used at a minimal amount, help in the production of agriculture by eliminating unwanted pests. But pests soon build up a defense system and are eventually immune to the pesticides and become very hard to get rid off. So, farmers have no choice but to increase in the amount of pesticides use. Hence, the impact is unimaginable.

Malaysia is forced to become a dumping site to the millions of tons of rubbish thrown every week due to sharp increase in the population. The latest three major cases of illegal dumping were allegedly done by licensed recyclers (Tan, 2006):

- (a) Hong Poh Metal is alleged to have dumped some 6,000 tones of aluminum dross in Sungai Gatom, Johor, since October, 2005.
- (b) In late January, some 400 tones of aluminum dross were found at several spots along Sungai Klang in Selangor.
- (c) In January last year, 15,000 drums of sludge and oil were found at an unauthorized site at Sungai Kandis in Klang, Selangor.

## **Air Pollution**

Malaysia has risen to the industrial age, but at the cost of the environment. Many industrial zones have been approved by the government to be set up in mostly forestland and uninhabited areas. One very good example of the industrial zone is of Shah Alam, in the state of Selangor. As a result, trees have been cut down to accommodate towards the building of large industrial factories. Not only the oxygen supply has been decreased, these factories are spewing out poisonous gases in the course of its production.

Naturally, people would flock to industrial zones such as Shah Alam because of the high pay and high opportunity of jobs involved. Shah Alam is now one of the most densely populated areas as well as one of the most highly polluted areas in the country. The increasing amount of cars in Malaysia also has lent a hand in the pollution which caused excessive emission of poisonous gases and heat.

Open air burning has not been avoided by the people of Malaysia, despite being banned by law. Ironically, burning is the only way right now to get rid of the excess rubbish. As a result, smoke and heat is released, worsen air pollution problem.

## **Water Pollution**

As Malaysia is fast becoming an industrial country, many of her rivers have become polluted due to the many wastes that have been poured out into her rivers. For example, the paper making industry uses chemicals, often poisonous, in its production. The rivers are used as an outlet for the chemicals to drain away, in turn harming the waters and the lives that revolve around them.

The rivers have become a tourist attraction and this has prompted the construction of hotels and resorts around the area. As a result, many of the forests

surrounding the river areas have been chopped down. The surrounding soil has no roots to hold, and runs into the rivers and soon the rivers become murky and shut out all the sunlight from reaching the aquatic life in the rivers and streams. This causes them to die. A good example is the construction of a new golf course near the waterfall at tourist attraction Fraser's Hill in the state of Pahang, causing it to become extremely murky and dirty.

Fortunately, environmental issues in Malaysia have been getting attention from government authorities, environmental groups and business communities. In fact, river pollution and the recent incident of smelly piped water in certain parts of Klang Valley have been hot topics at the Parliament. Various efforts have been forwarded with the intention to create awareness, improve environmental concern and change attitude of the public. e.g. education and training programs, enactment of legislation and law, recycling campaigns, pollution prevention and environmental quality programs, etc. However, mixed results have been achieved as to the effectiveness of the above efforts, for example some recycling campaigns have faced low response initially and required re-launching to attract public attention.

Consequently, all these will lead to a series of concerning issues, i.e. what is the level of environmental concern, intention and behavior of consumers in Malaysia, as well as the relationships among these variables as listed in the research question section below which will be studied by the researcher.

### **1.3 Research Questions**

From the above problem statement, the researcher has developed the following questions to be studied:

- i. What are the levels of environmental orientation (environmental concern, intention and behavior) of consumers in Malaysia?
- ii. Are environmental concern and intention (verbal commitment) of consumers in Malaysia moderated by the perceived effectiveness of pro-environmental campaigns?
- iii. Are environmental concern and behavior (actual commitment) of consumers in Malaysia mediated by their environmental intention?

### **1.4 Research Objectives**

Basically, the purpose of research is to study how consumers in Malaysia perform on objective measures of environmental concern, intention and behavior. In line with the research questions above, specific objectives for the study are:

- i. To identify the level of environmental concern, intention and behavior of consumers in Malaysia, and their relationships.
- ii. To identify whether the perceived effectiveness of pro-environmental campaigns has moderating effect between environmental concern and intention of Malaysian consumers.
- iii. To identify whether environmental intention has mediating effect between environmental concern and behavior of Malaysian consumers.

## **1.5 Significance of the Study**

Environmental behavior studies are scarce in Malaysia, and local literature in this domain can be hardly found, even in universities. Hence, knowledge with regards to environmental behavior in the Malaysian context is very much desired. The findings of this study will give insight on environmental orientation of consumers in the local context. The research results will give indications on environmental concern and behavior of today's consumers. This knowledge will help in understanding of their environmental orientation and further projection of their future behavior. Consequently, the various stakeholders of the environment will be benefited in the following ways:

- (1) The research findings will contribute to knowledge advancement of the environmental behavior domain by adding new knowledge to the literature;
- (2) The government will be able to capitalize on the research findings for better environmental issues policy making. Likewise, local authorities like municipal councils can also implement better actions by making use of the research findings;
- (3) The manufacturing industry can incorporate knowledge from the research findings into their research and development, in turn to develop or start with green products that are not only environmental friendly, yet also are able to meet the needs and wants of environmentally cautious consumers.
- (4) The research findings will benefit the society as a whole. For example, non-government organizations, environmental groups, etc. can plan better educational programs or campaigns to obtain better results for environmental protection purpose.

## **1.6 Definition of Key Terms**

Several phrases or words use in this research had been conceptualized as follows:

### ***1.6.1 Environmental Concern (EC)***

Dunlap and Jones (2002) stated (as cited in Hunter, Hatch & Johnson, 2004) that environmental concern refers to the degree to which people are aware of problems regarding the environment and support efforts to solve them. Environmental concern is conceptualized as having a cognitive (knowledge) and a normative (belief) component respectively. These two components, knowledge and belief constitute two dimensions (environmental knowledge and environmental belief) of environmental concern.

#### ***A. Environmental Knowledge***

It refers to how much an individual knows about facts on environmental issues (Chan & Yam, 1995). It includes general knowledge and more specific technical knowledge (Benton, 1994).

#### ***B. Environmental Belief (Abbreviated New Environmental Paradigm-Based Scales)***

An individual's belief on environment issues is measured by Abbreviated New Environmental Paradigm-Based Scales (ANEPS). It has been derived from the combined pool of items in New Environmental Paradigm Scale (NEP) (Dunlap & Van Liere, 1978), and its revised version termed New Ecological Paradigm scale (NEPS) (Dunlap, Van Liere, Mertig, & Jones, 2000).



### ***C. General Level of Environmental Concern***

It measures the level of environmental concern respondents possess in general term. e.g. the extent to which participants considered themselves to be in favor of the defense of the environment.

#### ***1.6.2 Verbal Commitment (VC)***

It refers to the self-reported willingness (intention) of an individual to engage in environmentally friendly activities (Chan & Yam, 1995).

#### ***1.6.3 Actual Commitment (AC)***

It refers to the actual engagement (behavior) of an individual in environmentally friendly activities (Chan & Yam, 1995). The self-reported approach was employed in this study instead of direct observations of environmental friendly behavior, due to the potential difficulties associated with direct observations. The self-reported approach has been applied by social scientists earlier. e.g. Maloney and Ward (1973); Maloney, Ward, and Braucht, (1975); Benton (1994); Chan and Yam, (1995); and Chan (1999).

#### ***1.6.4 The Perceived Effectiveness of Environmental Campaigns***

It measures the perception of an individual on effectiveness of environmental campaigns in reducing environmental problems or improving the environment. The types of environmental campaigns chosen are recycling campaigns, which have been cited by Folz, (1999) as the singular environmental success story of the decade.

## **1.7 Organization of Chapters**

The research report consists of five chapters. As an introduction chapter, Chapter 1 gives an overview of the research and its background set up. The problem statement is defined along with the key research objectives that the researcher plans to achieve. Chapter 2 presents the literature reviews on elements relating to this research such as the environmental attitude-behavior relationship, environmental concern, environmental knowledge, environmental belief, environmental intention, behavior, and the perceived effectiveness of pro-environmental campaigns. How the theoretical framework and hypotheses are developed also discussed in this chapter. Chapter 3 explains the methodology used in this research, questionnaire development, measures, sampling design, data collection, coding and analysis. Chapter 4 presents the profile of the respondents and the descriptive analysis on the research data. The chapter also explains the detailed analysis performed and the hypothesis testing with the summary of findings, statistical results and relationship among variables. Finally, the research paper concludes with Chapter 5 on the results interpretation and discussion. The findings from the study are discussed in the context of its implication and contribution. Any limitation observed is also reviewed with recommendations and suggestions on how future research in the related field can be improved.

## **Chapter 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The researcher explores a few models related to environmental concern and behavior introduced by previous researchers from the literature. From all the models, the researcher developed a conceptual framework suited for the study. The following sections include reviews of related literature to the study.

#### **2.2 Environmental Concern and the Theoretical Background**

Hodgkinson and Innes (2000) mentioned that one of the most characteristic features of modern society was the high level and generalized environmental concern, reflected the growing awareness of the impact of human activity on the environment.

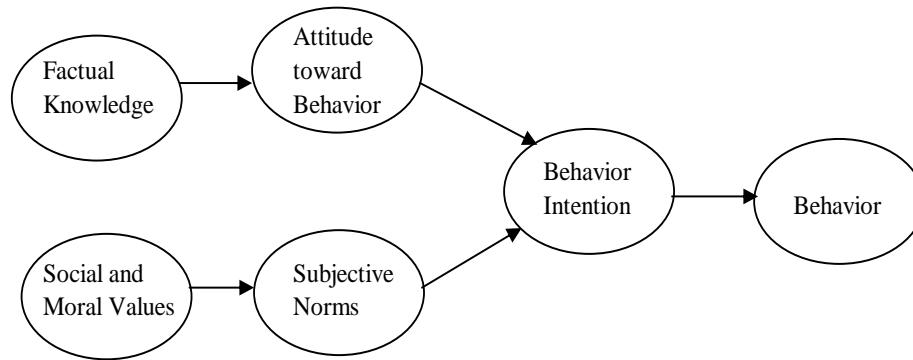
Environmental concern had been treated differently under various past studies. Some study treated it as synonymous to attitude. e.g. Kaiser, Wolfing, and Fuhrer (1996); Newell and Green (1997); Sherburn and Devlin (2004); knowledge and attitude e.g. Lee, An, Chan, and Kwan (2000); and knowledge and belief. e.g. Gill, Crosby, and Taylor (1986), etc. Lee et al. (2000) investigated students' environmental concern by acquiring their written comments about things that students treasured very much and considered important. In this way, environmental knowledge and attitude of students were captured to understand their environmental concern. Schultz (2001) concluded that there were three categories of people's environmental concerns: the importance a person places on 1) himself, 2) other people and 3) plants or animals, which in turn will form beliefs and values of the person that can further lead to his eco-friendly acts and behaviors.

On the other hand, Hunter et al. (2004) stated that within social science research, objects of environmental concern are presented as specific issues (e.g. carbon dioxide emissions, nuclear power) or sets of phenomenon (e.g. the natural environment, global warming, economic development, biodiversity loss, etc.). In line with the above statement, for the current study, the researcher has conceptualized environmental concern as having a cognitive (knowledge) and a normative (belief) component respectively. These two components, knowledge and belief constitute two dimensions (environmental knowledge and environmental belief) of environmental concern. The researcher has considered that the environmental affect scale of Maloney and Ward (1973) scale (refer 2.2.2) has been much researched and its positive relationship with environmental intention has been confirmed. Therefore environmental belief which is also a normative scale has been applied as one of the dimension of environmental concern, instead of environmental affect.

In order to capture and study the relationship between environmental concern and environmental behavior, relevant theories in environmental marketing domain are reviewed. For instance the theory of reasoned action (Ajzen & Feishbein, 1972), the theory of planned behavior (Ajzen, 1991; Ajzen & Madden, 1986) and The New Environmental Paradigm (NEP) (Dunlap & Van Liere, 1978) and its derivatives (NEPS and ANEPS) are reviewed, in an effort to understand past studies and to design an appropriate research model for the current study.

### ***2.2.1 Theory of Planned Behavior and the New Environmental Paradigm (NEP)***

The theory of planned behavior was derived from the theory of reasoned action (Ajzen & Feishbein, 1972). For illustration, the theory of reasoned action is shown as Figure1.1.



*Figure 1.1.* The theory of reasoned action.

In both theories, intentions to perform behaviors of different kinds can be predicted with high accuracy from attitudes toward the behavior; and these intentions, together with perceptions of behavioral control, account for considerable variance in actual behavior. The theory of planned behavior extends the theory of reasoned action by its inclusion of influence on behavior beyond people's control (Kaiser, et al., 1996). As cited in Gill et al. (1986), perhaps the most widely researched model in consumer behavior was based on Ajzen and Fishbein's Theory of Reason Action. Introduced in by Fishbein (1967), the theory had been developed, refined, tested (Feisbein & Ajzen, 1975; Ajzen & Fishbein, 1980), and applied in numerous contexts, including voting behavior, family planning, occupational choice, and brand choices, in the tradition of attitude research. The theory posits that people consider the implications of their actions and form intentions before engaging in a behavior. According to the theory, the determinants of behavioral intention are attitude toward the behavior and subjective norm (perceived normative expectations of various important others). Further, the determinants of attitude is cognitive structure, i.e., beliefs that the behavior leads to certain outcomes, and the evaluations of those outcomes; where as the determinant of subjective norm is normative structure, i.e.,

belief about the normative expectation of special referents, and the motivation to comply with those expectations.

Later, the theory of planned behavior was developed from the theory of reasoned action by the inclusion of influences on behavior beyond people's control. It was considered useful in predicting ecological behavior. In a study by Hines, Hungerford and Tomera (1987), it was found that ecological behavior appears to be susceptible to a wide range of influences beyond one's control. Consequently, the theory of planned behavior, which includes behavior constraints beyond volitional control, has to be considered especially more useful than theory of reasoned action, in predicting ecological behavior (Kaiser et al., 1996).

Besides that, another prominent school of environmental attitude research is the New Environmental Paradigm (NEP), consists of 12 items, developed by Dunlap and Van Liere (1978). This tradition regards one's moral values/ beliefs as the core concept of environmental attitude. The items for NEP are listed below:

1. We are approaching the limit of the number of people the earth can support.
2. The balance of nature is very delicate and easily upset.
3. Humans have the right to modify the natural environment to suit their needs.
4. Mankind was created to rule over the rest of nature.
5. When human interfere with nature it often produces disastrous consequences.
6. Plants and animals exist primarily to be used by humans.
7. To maintain a healthy economy we will have to develop a "steady-state" economy where industrial growth is controlled.
8. Humans must live in harmony with nature in order to survive.
9. The earth is like a spaceship with only limited room and resources.

10. Humans need not adapt to the natural environment because they can remake it to suit their needs.
11. There are limits to growth beyond which our industrialized society cannot expand.
12. Mankind is severely abusing the environment.

Then, NEP had since become a widely used measure of pro-environmental orientation. Proponents of this tradition regard one's moral value as the core concept of environmental attitude. e.g. Stern, Dietz, and Kalof (1993).

In an effort to make improvements to the original NEP, Dunlap et al. (2000) had developed a revised NEP Scale, referred as the New Ecological Paradigm Scale (NEPS), consisted of 15 items. According to Dunlap, this revised version had been designed to improve the following aspects: i) It taps a wider range of facets of an ecological worldview. e.g. added in more ecological-items like "The so called ecological crisis facing humankind has been greatly exaggerated." ii) It offers a balanced set of pro- and anti-NEP items. e.g. added more negative-impact NEP items like "If things continue on their present course, we will soon experience a major ecological catastrophe." and iii) it avoids outmoded terminology. e.g. replaced *mankind* with *human* in "Mankind is severely abusing the environment."

Further, in year 2003, Cordano, Welcomer, and Scherer had developed the Abbreviated NEP-Based Scales (ANEPS), consisted of 8 items, by referring to NEP and NEPS. The items had been grouped under two dimensions, i.e. "balance" which focused on issues of balance and the damage resulting from ecological systems being out of balance; and "human domination" concerning antianthropocentrism. The items for ANEPS are listed below, under their respective dimensions:

## **Balance**

1. The balance of nature is very delicate and easily upset.
2. When human interfere with nature it often produces disastrous consequences.
3. Humans are severely abusing the environment.
4. The so called ecological crisis facing humankind has been greatly exaggerated.
5. If things continue on their present course, we will soon experience a major ecological catastrophe.

## **Human Domination**

1. Humans have the right to modify the natural environment to suit their needs.
2. Humans were meant to rule over the rest of nature.
3. Plants and animals exist primarily to be used by humans.

The ANEPS explains as much variance, or more than the NEPS. The strength of the ANEPS is that they enable researchers to fit into studies that need to minimize the number of items use to keep their questionnaire a user-friendly length.

### ***2.2.2 The Environmental Attitude-Behavior Relationship***

As cited in Kaiser et al. (1996), global environmental problems of shrinking natural resources, pollution and population growth challenged the way people live. As with many other disciplines, psychology attempted to develop human societies less exploitive in their use of Earth's natural resources (Stern, 1992). Psychologist referred to individual behavior and asked questions such as, "What determines an individual's ecological behavior?" or "How can behavior be changed in a more ecological direction?" In answering these questions, environmental attitude was considered one of the most promising concepts.



Two basic lines of research on environmental orientation had been identified (Diez, Stern, & Guagnano, 1998). One of these research lines had been identifying the socio-demographic factors, eg. gender, age, educational level, etc. Another one had focused on psychological determinants, e.g. value, attitudes and beliefs.

As pioneers in the environmental behavior research, based on the theory of planned behavior, Maloney and Ward (1973), and Maloney et al. (1975) had specifically constructed an “objective scale” to measure people’s ecological concern by conceptualized people’s environmental concerns as the amount of factual knowledge (environmental knowledge) about, the degree of emotionality (environmental affect) toward, the level of verbal commitment (environmental intention) to environmental issues. The specificity of Maloney and Ward scale greatly eased the task of environmental researchers. Originally, all three environmental attitude components were used in parallel to predict ecological behavior. However, some approaches used the concepts (knowledge, affect and intention) in a more sequential way to predict either environmental attitude or ecological behavior (Geller, 1981; Benton, 1994; Chan & Yam, 1995; Chan, 1999).

In fact, almost two thirds of all the publications included environmental attitude in one way or another. Consequently, the relation between environmental attitude and ecological behavior was well-explored. Nevertheless, their exact relationship had not been fully established (Chan, 1999; Martin & Simintiras, 1995; Pettus & Giles, 1987) because mixed findings had been found on the environmental attitude and behavior relationship. This empirical inconsistency was, in part, attributed to the different methods that were adopted to define and measure people’s environmental concern (Chan, 1999).

As this research is to study the environmental orientation of consumers, it is appropriate to review previous studies on environmental attitude and behavior. Key findings from selected studies relating to this interest are summarized in Table 2.1.

**Table 2.1**  
*Summaries of Selected Previous Studies*

Author (Year)	Research Settings	Variables	Sample	Method	Analysis	Major Findings
Berenguer, Corraliza, Martin. (2005)	Spain	Dependent: Environmental behavior Independent: 4 Structural variables Environmental concern Specific Attitudes	Two Stratified samples: Rural: 90 Urban: 95 Total: 185 subjects.	Explored links between certain social structures and environmental concern, attitudes and actions.	T-test Factorial analysis of variance. Person's X <sup>2</sup> test Factor analysis Regression analysis Correlation analysis	Level of concern was high. Level of responsible behavior was extremely low. City-dwellers scored higher on the NEPS than rural people. Moral obligation and pro-environmental behaviors were higher in the rural context.
Chan (1999)	China	Dependent: Actual Commitment Independent: Knowledge Mediating: Affect Verbal commitment	549 subjects	Studied the Environmental attitudes and behavior of consumers in China.	Exploratory Factor Analysis Reliability test Confirmatory Factor Analysis Structural Equation Modeling T-test	Mean scores were all far below the maximum of 1.0, except Environmental affect. Chinese consumers were not as generous as Westerners in green products purchase.
Kaiser, Wolfing, Fuhrer. (1996)	Switzerland	Dependent: General Ecological Behavior Independent: Knowledge And value Mediating: Ecological Behavior Intention	1189 subjects	Established environmental attitude as a powerful predictor of ecological behavior.	Structural equation modeling Principal Factor Analysis	Three concepts: Environmental Knowledge, Environmental Values and Behavior Intention, were suggested as the conceptual skeleton of the Theory of Planned Behavior. Ecological Behavior Intention predicts Ecological Behavior remarkably if consider behavior constraints people's control.

*Summaries of Selected Previous Studies*

Author (Year)	Research Settings	Variables	Sample	Method	Analysis	Major Findings
Chan, Yam. (1995)	Hong Kong	Dependent: Actual commitment  Independent: Environmental Knowledge Environmental Affect Environmental Intention	552 subjects	Tested the relationship between environmental attitudes and behavior, in an attempt to develop a framework to explain environmental behavior.	Descriptive statistics Correlation analysis Factor analysis Multiple regression analysis	Knowledge was only weakly related actual environmental behavior. The correlations of affect with VC and AC were much stronger. Verbal commitment was by far more powerful in explaining actual environmental behavior. consider behavior constraints people's control.
Benton (1994)	USA	Dependent: Actual behavior  Independent: Knowledge, Concern  Mediating: Willingness to act	266 students	Studied how business students perform on objective measures of environmental knowledge and attitude in comparison to non-business students.	Descriptive statistics One-way ANOVA Two-way ANOVA Spearman rank correlations	There was no significant difference in environmental knowledge between business and non-business students. Business students indicated less willingness to act in a pro-environmental manner, reported less actual behavior than non-business students.
Gill, Crosby, Taylor. (1986)	USA	Dependent: Voting behavior  Independent: Ecological concern  Mediating: Cognitive structure Normative structure Attitude Subjective norm Intention	662 subjects	Investigated and identified a set of intervening variables which mediate the effects of concern on behavior.	Structural equation analysis Chi-square goodness-of-fit test	The effects of ecological concern was mediated by attitudinal, normative, and intention variables.

### **2.2.3 *Environmental Knowledge***

Environmental knowledge can be defined as a general knowledge of facts, concepts, and relationships concerning the natural environment and its major ecosystems (Fryxell & Lo, 2003). In simple terms, environmental knowledge involves what people know about the environment, key relationships leading to environmental impacts, an appreciation of “whole system”, and collective responsibilities necessary for sustainable development. As pioneers in environmental research, Maloney and Ward (1973) identified factual knowledge of environmental issues as one of their four subscales. Hines et al. (1986) further proposed an environmental behavior model in which intention to take action is determined to be a combination of factors, including cognitive knowledge related to an individual’s awareness of existing environmental problems. On the other hand, Arcury (1990) mentioned that researches have very little information about how much the public actually knows about the environment, signified the need for further study on environmental knowledge. McDougall (1993) stated that consumers’ environmental knowledge is of paramount importance because the green revolution is primarily consumer driven. This implied that if consumers possess superior environmental knowledge, they can channel it into pro-environmental consumption behaviors. Similar study (Amyx, DeJong, Lin, Chakraborty, & Wiener, 1994) found that individuals highly knowledgeable about ecological issues are more willing to pay a premium price for green products.

### **2.2.4 *Environmental Belief (ANEPS)***

The original New Environment Paradigm (NEP) Scale was published in 1978, by Dunlap and Van Liere. It had become a widely used measure of pro-