Environmental attitudes and how they affect purchase intentions of environmentally friendly automobiles

An empirical study on Chinese students at Jönköping University

Master Thesis in business administration
Authors: Olof Henning
          Samuel Karlsson

Tutor: Thomas Mullern
Jönköping 2011
Abstract:

Consumers today are becoming more aware of how their behavior and use of resources affect the environment. It is becoming increasingly important for companies to understand consumer's attitudes in order to predict their behavior. Extensive research has been conducted on the attitude-behavioral relationship in various fields of study. However, no research has been made on the attitude towards environmentally friendly automobiles and how it affects purchase intentions. Our research has been made in collaboration with Volvo Car Corporation which in 2010 was acquired by Geely Automobile. The acquisition meant that an opportunity presented itself on the Chinese market, which today is the largest automobile market in the world. The thesis will focus on young Chinese consumers' attitude toward the environment and how this may affect their purchase intentions towards environmentally friendly automobiles. The basis for our reasoning is that the factors environmental values, environmental knowledge and responsibility feelings make up an individual's environmental attitude.

The purpose of this thesis is to investigate how environmental values, environmental knowledge and responsibility feelings affect purchase intentions towards environmentally friendly automobiles among young Chinese consumers.

We have used a quantitative approach in our collection of empirical data. With the help of a web-based self-completion survey we managed to send out the questionnaire to all Chinese students studying at Jönköping University and received a high response rate of 65%. We based the design of the survey on a model from Kaiser, Ranney, Hartig and Bowler (1999).

The major findings from our research conclude that the used model does not substantially explain the purchase intentions of environmentally friendly automobiles. Our research suggests that the factors environmental knowledge and responsibility feelings are not significant when predicting intentions to purchase environmentally friendly automobiles. However, the factor environmental values proved to be strongly correlated when predicting intentions to purchase environmentally friendly automobiles.
Acknowledgements

- All respondents that took their time and participated in our questionnaire
- Volvo Cars and especially to Lena Lönnqvist for her support throughout our thesis
- Clas Wahlbin for his persistence and help to make this thesis outstanding
- Finally, Tomas Müller for guiding us during the whole process

Olof Henning                     Samuel Karlsson
Table of Contents

1 Introduction ............................................................................................................... 1
  1.1 Volvo Car Corporation and Green Consumer Trends ........................................ 1
  1.2 Purpose ............................................................................................................... 3
  1.3 Research Questions .......................................................................................... 4

2 Theoretical framework ............................................................................................. 5
  2.1 Chinese market .................................................................................................. 5
  2.2 Green Marketing ............................................................................................... 7
  2.2.1 Green Consumer .......................................................................................... 7
  2.3 Attitudes ........................................................................................................... 8
  2.3.1 The functional approach ............................................................................. 10
  2.3.2 The structural approach ............................................................................. 11
  2.3.3 Rational Choice Theory ............................................................................ 11
  2.3.4 Environmental attitude models .................................................................. 14
  2.4 The proposed model ......................................................................................... 15
  2.4.1 Environmental Knowledge, Values, Responsibility Feelings and Intentions 16
  2.5 Proposed Hypotheses ...................................................................................... 18

3 Method ...................................................................................................................... 19
  3.1 Approach method and techniques ................................................................... 19
  3.2 Research Approach ......................................................................................... 20
  3.3 Construct of Survey ......................................................................................... 20
  3.4 Pretest ............................................................................................................... 21
  3.5 Design of the Questionnaire ............................................................................ 22
  3.6 Research Data Collection ............................................................................... 24
  3.7 Data Quality ..................................................................................................... 26
  3.7.1 Reliability .................................................................................................. 26
  3.7.2 Validity ....................................................................................................... 27
  3.8 Statistical Methods used in the Analysis ......................................................... 27

4 Results ....................................................................................................................... 29
  4.1 The sample ....................................................................................................... 29
  4.2 Environmental car ranking ............................................................................... 29
  4.3 Attribute Ranking ............................................................................................ 30
  4.4 Attitude Variables ............................................................................................ 31
  4.4.1 Responsibility feelings ............................................................................... 31
  4.4.2 Environmental values ............................................................................... 31
  4.4.3 Environmental knowledge ......................................................................... 32
  4.4.4 Environmental Intentions .......................................................................... 33
  4.5 Factor Analysis .................................................................................................. 33
  4.6 Cronbach’s Alpha test ...................................................................................... 37
  4.7 Regression Analysis ......................................................................................... 37

5 Analysis and Discussion .......................................................................................... 40
  5.1 Responsibility feelings ...................................................................................... 40
  5.2 Environmental Knowledge ............................................................................... 41
  5.3 Environmental Values ...................................................................................... 43
5.4 Concluding analysis .............................................................................45

6 Conclusions .........................................................................................46
6.1 Criticism against our research .................................................................46
6.2 Future Research ..................................................................................47

7 Practical Implications for Volvo .........................................................48

8 References: .........................................................................................50

9 Appendix .............................................................................................56
9.1 Appendix A Questionnaire .................................................................56
9.2 Appendix B VCC environmental friendliness ........................................61
9.3 Appendix C Scree plot ........................................................................62
9.4 Appendix D Multivariate regression analysis .......................................64
9.5 Appendix E Separate regression analysis .............................................66
9.6 Appendix F Additional multivariate regression analysis .......................67

FIGURES:

Figure 2.1 Different types of evaluative response (Ajzen, 1988) ....................9
Figure 2.2 Theory of Reasoned Action (Ajzen and Fishbein, 1980) ..............12
Figure 2.3 Theory of Planned Behavior (Ajzen, 1991) ................................13
Figure 2.4 Ecological behavior as a function of environmental attitude (Kaiser, Ranney, Hartig and Bowler’s, 1999) .................................18

Figure 4.1 Environmental attitude model (Kaiser et al, 1999) ....................39

TABLES:

Table 4.1 Gender Distribution ..................................................................29
Table 4.2 Age Distribution ........................................................................29
Table 4.3 Rank of perceived environmental friendliness of car brands .......30
Table 4.4 Attribute ranking .....................................................................30
Table 4.5 Responsibility feelings variables ...............................................31
Table 4.6 Environmental values variables ...............................................32
Table 4.7 Environmental knowledge variables .......................................32
Table 4.8 Intention variables ....................................................................33
Table 4.9 Factor loadings from environmental responsibility variables .....34
Table 4.10 Factor loadings from environmental values variables ............35
Table 4.11 Factor loadings from environmental knowledge variables .......36
Table 4.12 Cronbach’s Alpha scores testing internal consistency .............37
1 Introduction

*In the introductory section the background will be given to motivate the relevance of the thesis which is followed by a problem discussion to narrow down the presented problem. The section will end with a presentation of the purpose and the two main research questions that this thesis seeks to address.*

1.1 Volvo Car Corporation and Green Consumer Trends

Volvo Car Corporation (VCC) is Sweden’s largest automobile manufacturer. During 2010 Geely Automobile acquired VCC and thereby incorporated the Swedish car manufacturer in their portfolio. This adjustment may affect VCC and invoke changes in regard to future investments while opening up new market opportunities. Since the downturn in sales during the recession in 2008, VCC together with many other European car manufacturers have recovered and increased production of passenger cars (ACEA, 2010).

VCC faces new challenges and stands at a crossroad where the company has to decide direction for the future. One of the more salient challenges on VCC’s agenda is of environmental orientation. Drive towards Zero is a program initiated to address technological solutions adapted to eliminate harmful emissions. The vision is to produce cars that are more environmentally friendly with the aim on developing cars that are completely free from emissions ([www.volvocars.com](http://www.volvocars.com)). Out of this vision comes the concept of DRIVe which symbolizes a broad commitment to develop environmentally friendly cars. The concept involves the whole product life-cycle, from product development through production and finally to the recycling. A great challenge that awaits VCC will be to successfully market and sell automobiles developed from their vision.

Today, many European consumers are aware of how their use of resources affects the environment. In an article regarding green electricity and willingness to pay by Hansla, Gamble, Asgeir and Gärling (2007), the authors found that a positive attitude towards green electricity was strongly correlated with increased willingness to pay. This indicates that a positive attitude towards green products can have a large effect on individuals’ motivation to pay. A company’s hard work toward environmental sustainability will be positive in many different ways. As cited by Oliver and Ha Lee (2010) firms can draw advantage of being environmental responsible by affecting consumers in ways that appeal to their values, thus making a company’s products more favorable. In line with this reasoning many companies have developed green products and programs to face this new development of environmental awareness (Min and Galle, 1997).

Consumers are becoming increasingly more conscious regarding environmental issues. The underlying dimensions contributing to the increase of environmental awareness is that the media industry has reported more extensively on the matter and that the con-
sumers’ ability to attain information about the subject has become easier. Furthermore, natural disasters and large industry failures add on to the shift in attention by the general public about how their practices affect the surrounding environment (Kalafatis, Pollard, East and Tsogas, 1999).

In another article concerning shifting perspectives and emerging trends the authors Schlegelmilch and Öberseder (2010) recognizes issues of environmental sustainability and green marketing as one of the most important upcoming research avenues. This reinforces the idea and signals the need for further research in the field of green marketing and how this affects consumers’ attitudes and purchase intentions.

Straughan and Roberts (1999) claim that younger individuals are more likely to acknowledge environmental issues since they have grown up with an understanding about the implications of this question. Another contributing factor that may have an influence on the attitude towards environmental issues is the education level of the individuals. This supports the above notion that further research needs to be conducted to verify and confirm attitudes of young educated individuals and their attitude toward green products.

The attitude-behavior relationship has been examined in many different topics such as recycling behavior (Cheung, Chan and Wong, 1999), binge drinking (Johnston and White, 2003) and green marketing (Kalafatis, Pollard and East, 1991). However, no academic research has been found concerning the attitude-behavior relationship in regard of environmentally friendly automobiles. This means that there exists a gap in the current research which demands attention which we seek to address. The research is relevant from an environmental point of view since we need to adapt and live in a sustainable environment where we conserve and care for the natural resources. However, it is also important to bear in mind that the research is also important from a health perspective because of the effect pollution has on the human physical condition.

In order to successfully market and sell automobiles it is important to understand what the consumers think and how they act in different circumstances. This constitutes the need to understand consumer behavior regarding purchasing intentions. To be able to predict consumer behavior it is important to comprehend what causes a behavior and shape individuals’ opinion. Many researchers agree upon the notion that attitude is a great influence on consumer behavior, which have been supported in several studies; see (Ajzen and Fishbein 1975, 1977; Sheppard, Hartwick, Warshaw, 1988).

Attitude has been given many different definitions but one of the more common and well-cited is formed by Allport (1935) who define attitude as "a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations which it is related"(p.810).
In order to capture the essence of attitude it is very important to explain the reasoning behind people’s actions which is the base for rational choice theories. Ajzen and Fishbein (1975, 1980) have developed a theory to explain how human behavior can be predicted by assuming individuals to be rational. According to this theory individuals systematically make use of their own knowledge and the information available to them when assessing an action. Based on this theory Ajzen (1991) has added an extension to deal with the fact that not all factors are voluntarily or under your control. This resulted in the development of the theory of planned behaviour where Ajzen (1991) provides a theoretical model to predict and understand behaviours in certain contexts.

More recent research have developed modified models based on theory of planned behavior or theory of reasoned action but more suitable for environmental attitude research purposes. Kaiser, Ranney, Hartig and Bowler’s (1999) environmental attitude model still remains with the same denominator in form of intention but has made a modification of the model’s factors. The model revolves around three factors that have a direct influence on individuals’ ecological purchasing intentions. The first factor is environmental knowledge which constitutes to the factual knowledge an individual has about the environment. The second factor that influences an individual’s purchase intentions is environmental values. Environmental values explain what values an individual has towards the environment which according to Kaiser et al (1999) have a significant influence on purchase intentions. The final factor included serves to answer the moral dimensions in the model that is connected to environmental behavior and is represented by individuals’ responsibility feelings.

As the above discussion indicates there is a need for further research within green marketing in the automobile industry. Since the acquisition of VCC by Geely Automobile a great opportunity has emerged for VCC on the Chinese market. Now VCC has access to valuable information and facilitated contact with the Chinese customers. Environmentally friendly automobiles are a steadily increasing trend throughout the world and we want to examine the possibility for VCC to seize this opportunity. VCC has expressed the wish to attract younger consumers and rejuvenate its customer base. This makes it important for VCC at an early stage to capture the view of this customer group. Environmental responsibility, environmental knowledge and responsibility feelings are three factors that make up the ecological attitude. Hence, this thesis will focus on investigating attitude among young Chinese consumers and how they position themselves towards environmentally friendly automobiles.

1.2 Purpose

The purpose of this thesis is to investigate how environmental values, environmental knowledge and responsibility feelings affect purchase intentions towards environmentally friendly automobiles among young Chinese consumers.
1.3 Research Questions

- How do environmental values, environmental knowledge and responsibility feelings influence the purchase intention of environmentally friendly automobiles among young Chinese consumers?
- Is there a demand for environmentally friendly automobiles among the young Chinese consumers?
2 Theoretical framework

In this section relevant theories and information will be presented to better understand and explain the purpose of the thesis. This section will start with a short presentation of the Chinese market to obtain an overview of the situational factors that may influence Chinese attitude towards environmental actions. The theoretical framework section will continue with presenting and discussing relevant theories for explaining environmental attitude and will end with the formulation of three hypotheses.

2.1 Chinese market

The thesis is very well connected to the Chinese market which highlights the need to understand factors of political and environmental character because of the impact it has on the attitude of Chinese consumers. China is the largest emitter of greenhouse gases in the world. With an economy growing at break-neck rate of around 8-10%, China is now one of the largest economies in the world (www.cia.gov).

China is a vast country with the largest population in the world. The recent economic growth has led to an increasing middle class that admires the western way of life, and just like Europeans they want their own house as well as their own car. This has lead to an increase of their resource utilization and a dramatic increase of CO₂ emissions. This phenomenon is not expected to fade, quite the contrary, China is on track to increase its energy demand by a significant margin over the next decade. Environmental degradation and deterioration is now a reality. Since 2000 China has had a CO₂ emissions increase of 170% and has thereby passed United States as the largest contributor (www.guardian.co.uk). United States Energy Administration has made a projection regarding the near future where China is expected to continue its increase of CO₂ emissions (http://www.eia.doe.gov/environment/). The price of the fast economic development also comes with repercussions and China has been exposed to many natural disaster, increased pollution and exhaustion of critical resources. However, China’s expenditures on environmental protection in relation to GDP is less than 1%, which is very low compared to other industrialized countries, such as United States(2,5%) and Australia (5%) (Chan, 2001).

The environmental problems were first recognized in 1970s when China introduced formal processes for environmental impact assessment (EIA). However, the impact of the EIA proved to be insufficient since China focused more on high economic growth rates. The EIA was modified in 2003 in order to better uphold the environmental regulations (Wang, Morgan, Cashmore, 2003). The Chinese government has therefore now partially understood the seriousness of the environmental problems and has passed several legislations in protection of the environment. Despite the adopted legislation the up-
holding and enforcement of regulations has been rather poor. According to Christmann and Taylor (2001) environmental regulations in China are not upheld in a stringent manner due to their flexibility. Companies that exceed emissions standards are not considered to violate the law; instead they get the opportunity to pay a fee to compensate for the exceeded emissions.

In December 2010 Beijing announced an annual cap on new automobile registration, starting early 2011 as a necessary measure to handle the problem of traffic jams and reduce vehicle emissions (www.mychinaviews.com). China’s capital has also tightened vehicle exhaust controls in 2009 by introducing a ban for passenger vehicles registered outside Beijing from entering the city if they do not meet exhaust emissions standards (www.chinaview.cn).

Beijing has played a pioneering role in controlling emissions from vehicles. A good example of how China has implemented nationwide regulations in order to decrease the energy consumptions of cars is the regulation of passenger cars to meet the fuel economy standards (Wagner, Cheng Wang, 2009). The fuel economy standards were implemented in two phases with the start of the first phase in 2005 and entering the second phase in 2008. The stringency of the Chinese fuel economy standards gives the country a ranking closely behind the Japanese and European standards, making China an initiator of environmental concern in the developing world by adopting fuel economy standards for vehicles (Oliver, Gallagher, Tian and Zhang, 2009).

The standards have been rather successful by decreasing the average fuel consumption of new cars by approximately 11%, from 2002 to 2006. Other regulations that work in favor of controlling emissions from cars are the subsidies for hybrid, electric and fuel-efficient car models. Under the new regulation, fuel-efficient vehicles will receive subsidies worth 3,000 Yuan per vehicle. Only vehicles with engines smaller than 1.6 liters will be approved for the incentives (www.Businessgreen.com). Furthermore, China has in 2008 raised the gasoline tax from the old tax rate of 0.2 Yuan to 1 Yuan per liter and diesel consumption tax from 0.1 Yuan to 0.8 Yuan per liter (chinaview.cn).

All of the above described measures prove a commitment from China to handle the problem of increased emissions from passenger cars. However, supplementary measures have to be implemented in order to change the direction China is heading for as the largest emitter of CO₂ emissions. But the past has proved that China can rapidly change its regulations in order to adapt to current situations as a result from their non-democratic state. When this change is made it is sufficient for car manufacturers that wish to be present on the Chinese market to meet the standards set by the Chinese government.
2.2 Green Marketing

There has been an increased awareness of environmental concern and consumers today are more conscious how their behavior affects the environment. Environmental issues have arisen from an extreme concern among the most conscious consumers to a mainstream issue (Kalafatis, Pollard, East and Tsogas, 1999). The term green marketing has been used to depict marketing activities with the aim to reduce the negative environmental and social impact that products might cause and how to promote those products to reach its consumers an effective way (Peattie, 2001). Environmental concern has moved from being a purely humane question for large corporation to become a necessity in order to stay competitive. According to Berry and Rondinelli (1998) a shift is now apparent that many large corporations have a proactive environmental management, this shift has been driven by governments, customers, employees, and competitors. Both investors and consumers are now recognizing the relationship between environmental quality and business performance. People today are more updated and aware of environmental issues which put pressure on governments to move toward a cleaner environment. However, big differences are apparent between industrialized countries and developing countries. For example, in the United States and many other industrialized countries environmental rules and regulations have been evident for many decades. In 1970 United States had approximately 2000 environmental regulations, three decades later there are more than 100,000 regulations (Berry and Rondinelli, 1998). According to Dean (2002) developing countries are considered to have relatively moderate environmental regulations compared to industrialized countries.

2.2.1 Green Consumer

The green movement can be considered as primarily consumer driven since it is the consumers who influences and puts pressure on companies, governments and organizations in order to promote activities concerning green marketing (Chan, 1999). This means that if consumers are becoming more aware and positive in regards to environmental issues the companies that drive business growth have to follow and adapt to the demand for green products. In the end, the companies have to fulfill the consumers’ needs and therefore the change starts with the customer.

When depicting the characteristics of green consumers, there are several possible ways which can be used when segmenting this group. Alternatives such as using demographic characteristics, psychographic characteristics or attitude dimensions are reviewed by Straughan and Roberts (1999) in their study about environmental segmentation. In their review they bring up age as a demographic characteristic that is significant according to many earlier studies when estimating ecologically conscious customer behavior. In the study they made use of college students in an American university as a representation of the future of ecologically conscious consumption. The findings from their study high-
lighted the importance of not only using demographic characteristics as a segmentation tool in the future. Psychographic characteristics such as altruism and attitude dimension should also be involved since their findings in those aspects were very positive when profiling green consumers (Straughan and Roberts, 1999).

In an article by Mendleson and Polonsky (1995) the authors give examples of research that support the notion that customers are becoming more interested in green products. However, they also emphasize that there are obstacles with green marketing which impedes the change among consumers that relates to three main problems: low credibility, consumer cynicism and consumer confusion. These problems refer to many companies precedent environmental performances and how they have acted in a misleading way which has raised suspicion among consumers about the claims of many companies. An article by Carlson, Grove and Kangun (1993) brings up the issue about companies that advertise themselves as environmentally friendly but do not align their corporate culture with that statement. This creates confusion and suspicion among consumers who consider this as very deceptive and consequently affects their attitude toward many of these companies. The information presented indicates a stronger need for morally sustainable environmental solutions that are easily accessible and transparent making the green consumer in charge of the shift towards a more sustainable environment.

2.3 Attitudes

There is a very rich and comprehensive foundation of research conducted on the subject of attitude (Ajzen and Fishbein 1975, 1977; Sheppard, Hartwick, Warshaw, 1988). Since the beginning of the twentieth century social psychologists have been debating and focusing on attitude to such a large extent that social psychology became synonymous with attitude (Fiske et al, 2010). Gordon Alport, who is considered as one of the pioneers in attitude research claims in a very well cited book that “attitude is the most distinctive and indespensible concept in contemporary social psychology” (Allport, 1935, p. 798). Attitude direct how we are as human beings, e.g. what product preferences a person has, what causes to support and how we act in response to others. Understanding what attitude is and how it can affect a consumer is one of the most studied theoretical concepts of behavioral research (Solomon, M.R. 2010). No formal definition of attitude has been agreed upon. However, most psychology researchers generally speak of attitude as persons like or dislike of a certain attitude object. The term attitude object will be used in the rest of this thesis to refer to a person, an event, an object or any other aspect of the individuals’s world. There are different approaches in social psychology in the research filed of attitudes, which will be elaborated in later sections. The most prominent theories will be presented in order to get a comprehensive overview of the concept of attitude.
The relation between attitude and behavior was first academically acknowledged and empirically studied by Richard LaPiere (1934) who tried to investigate the discrepancy between attitude and behavior. His research showed a clear gap between an individuals’ attitude towards a behavior and their actual behavior. LaPiere was the first among many researchers to explore the relationship attitude and behavior. Rijnsoever, Farla and Dijst (2009) wrote in their article based on a report from the European Commission that 75 % are ready to change their purchase behavior and buy environmentally friendly products even if they are usually more expensive. However, among the same respondents only 17 % were actually willing to abandon their former habits, such as driving in a more limited manner, indicating that there is a gap between individuals’ readiness to change and the actual behavior.

Attitude is obviously only a hypothetical construct meaning that it is only possible to measure it indirectly. According to Manstead (1996) an attitudes existence is contingent from certain classes of evaluative responses to the attitude object. For example, if a person has a membership in an environmentally active organization which promotes issues regarding pollution of the environment we would probably assume that this person also has a positive attitude toward environmentally friendly behavior in general. Ajzen (1988) proposed a good categorization procedure to capture and organize different types of evaluative responses. By separating verbal from nonverbal responses he was able to organize the different responses in a useful way. The given example above would therefore indicate a nonverbal response while making verbal remarks on environmental issues would of course be classified as a verbal response mode. To clarify, the previous example would according to Ajzen be classified as a behavior response meaning that the person shows expression of behavioural intentions towards attitude objects, see figure 2.1.

**Different types of evaluative response**

<table>
<thead>
<tr>
<th>Response mode</th>
<th>Affect</th>
<th>Cognition</th>
<th>Behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal</td>
<td>Expressions of feelings towards attitude object</td>
<td>Expressions of beliefs about attitude object</td>
<td>Expressions of behavioural intentions towards attitude object</td>
</tr>
<tr>
<td>Nonverbal</td>
<td>Physiological responses to attitude object</td>
<td>Perceptual responses (e.g. reaction time) to attitude object</td>
<td>Overt behavioural responses to attitude object</td>
</tr>
</tbody>
</table>

Figure 2.1 Different types of evaluative response (Ajzen, 1988)
2.3.1 The functional approach

According to the functional approach an attitude exists because they have a functional role for the person. It is an individual’s motive that determines the attitude (Solomon, M.R. 2010). Katz (1960) has identified four different reasons for attitudes functions, each can be classified according to the functions they meet.

The utilitarian function is related to rewards and punishments. The attitude of an obtained object is simply apparent because it provides pleasure or pain. For example, an attitude towards automobiles can be based on rewards (e.g., engine performance) and punishment (e.g., high maintenance costs). Value expressive functions are attitudes that exist because a consumer looks upon a product as an extended self. The focus lies entirely on how a product can express one’s identity instead of looking upon a product benefits through its features. Ego-defensive attitudes are formed to defend the person from either internal or external threats. For example if a person has a positive attitude toward an environmentally friendly car due to this function, he or she may feel obliged to have this attitude in order to not feel guilty due to the impact the car may have on the environment. Another discussed function is knowledge, which is apparent due to the need for order or meaning. This function often exists when a person is in an unknown situation and feeling insecure when confronted with a new product, such as an environmentally friendly automobile. All these functions can work by themselves or together with other functions, which is often the case. However, usually there is one function that serves as the dominant one. It is vital for a marketer to identify this function in order to emphasize the benefits in the advertisement to achieve more positively thoughts to both the advertisement and the product (Katz, 1960).

Functions of attitudes can differ depending on what type of monitor an individual represent. The two types of monitors, low and high vary in individuals’ expressive controls. A high self-monitor is concerned about their surrounding and to get positive feedback for their actions. On the other hand a low self-monitor is more concerned about their own internal thoughts and do not care much about the surrounding. It is important to understand what type of monitor your target group represents in order to convey an appealing message (Johar and Sirgy, 1991). However, it is also important to understand that a product can serve multiple purposes. For example, cars can have both a self-expressive purpose by giving the individual an identity but also a utilitarian purpose by taking the owner from one place to another (Shavitt, 1992). To clarify, when it comes to low and high self-monitors, the differences can be described as how individuals look upon a product. If it is important for an individual to meet the requirements of the social group an individual belong to, than this person is a high self-monitor. If the person on the other hand is more concerned about their own preferences, the person is instead a low self-monitor (Snyder, 1974).
2.3.2 The structural approach

One of the most recognized and used structural approaches to explain attitude is the three component view (Evans, Jamal and Foxall, 2009). This approach simplifies matters by categorizing attitude-relevant response into various subgroups (Ajzen, 1989). Namely into three different components, a cognitive, an affective and a conative which all make up the attitude. The recognition of these three components goes back to the days of Plato but are still considered to be prominent which is reinforced by Hilgard (1980) who claims that they are still useful in the research field of attitudinal psychology.

The cognitive component consists of a person's knowledge or beliefs about an attitude object. This knowledge or belief does not always correspond to the actual object, meaning the object may differ from the belief a person has of the object. If you more closely investigate the cognitive component it varies in regard of the amount of knowledge and the centrality of the knowledge in relation to the attitude object. The difference of the knowledge depends on if the information is one-sided, biased or versatile (Linden, 1994). The affective component is the positive or negative feelings or emotions that a person may have toward an attitude object. These are apparent due to beliefs about the attitude object that the individual possess. The conative or the behavioral component is the readiness of an individual to respond to an attitude object based on the individual’s prior beliefs, feelings and knowledge (Evans, Jamal and Foxall, 2009). How a person responds to an attitude object is vastly dependable of the perception of and the information a person has of the attitude object (Ajzen, 1989). However, it is important to understand what a person intend to do not always result in an actual behavior.

There has been research indicating that values are causally connected to consequent behavior (Williams, 1979). The author argues that values are the ruling principle influencing judgment, preferences and ultimately selection. This means that values have an imperative role in predicting behavior because of the influence it has on individuals’ decision process. Furthermore, according to this reasoning implicit values will also be used as decision-making material when making choices.

2.3.3 Rational Choice Theory

Actions and opinions are often believed to be carefully considered and based on conscious choices. Rational choice theory is often used to explain social or economical behavior and the fundamental basis for rational choice theories is that people are expected to act rationally. Common for the framework is that people's choice is seen as conscious and is directly influenced by the expected outcome of the decision. In other words, people's decisions are governed by the costs and benefits of different outcomes (Hedström and Stern, 2008).
Rational choice theories have also paved the way for other important works, such as Ajzen and Fishbein (1975; 1980) and their article on theory of reasoned action which can be viewed in figure 2.2. The aim with their theory is to predict and understand individuals' behavior and have done this successful with their attitude-behavior model (Sheppard, Hartwick and Warshaw, 1988). According to their theory, an individual's intention is based on two elements and in order to predict behavior we must get an understanding of the underlying elements. Ajzen and Fishbein (1980) reason that intention should correspond to the motivational commitment that affect behavior. Stronger intentions would therefore predict a larger increase in the occurrence of the actual performance. The theory of reasoned action has received much attention in the area of consumer behavior because of the ability to predict human intention and behavior in a successful way (Manstead, Proffitt and Smart, 1983). A central concept in the theory is that an individual's intention is a function of two factors. The first element is an individual's attitude towards a behavior and the other is the subjective norm. An individual's attitude towards a behavior can be summarized as the personal favor or disfavor towards a specific behavior. For instance, people may differ in their evaluation of purchasing environmentally friendly detergents; some might have a positive attitude while others have a negative attitude to these intentions.

![Figure 2.2 Theory of Reasoned Action (Ajzen and Fishbein, 1980)](image-url)

This means that the attitude between people can differ depending on what kind of behavior is measured. To clarify, if two individuals are supposed to drive a car it is very likely that they could have a different attitude towards driving, one person might be more positive towards driving while the other could be more negative. Unlike individual's attitude towards a behavior which focuses on the person's beliefs and evaluation of a behavior subjective norm emphasizes how peer pressure and motivation to comply influence intentions. This can be exemplified by how an individual can be directly influenced by friends or family's opinions when making a decision. What is essential to men-
tion is that relative importance might also come in to play given that the two elements contradict each other. This means that depending on the intentions and behavior the two elements have varying impact. Furthermore, in order to grasp the whole picture it is essential to understand why individuals have specific attitudes and subjective norms. As you can see in figure 2.3, both attitude toward the behavior and subjective norm is functions of beliefs, however, different kinds of beliefs. Attitude toward the behavior is a function of behavioral beliefs and subjective norm is a function of normative beliefs. The difference is that that attitude toward the behavior is more concerned with personal evaluations and subjective norm is more regarding the individual’s beliefs about what others think (Ajzen and Fishbein, 1980; Ajzen and Fishbein, 1975).

Figure 2.3 Theory of Planned Behavior (Ajzen, 1991)

After the publishing of theory of reasoned action the authors received some criticism regarding the disregard to volitional control. This influenced Ajzen to further develop and refine his model by including a third element. The new model referred to as the theory of planned behavior extended the scope through the element perceived behavioral control. The theory of planned behavior suggest that intention is affected by the two independent factors previously mentioned and the new third element perceived behavioral control (Ajzen, 1991). The third element represents an individual’s perception of how difficult or easy it is to perform a certain act. When performing a difficult behavior, you will have low perceived behavioural control and vice versa. The perceived behavioral control element jointly determines intentions together with attitudes toward the behavior and subjective norms. However, it differs from the other determinants in an apparent way by also jointly determining behavior together with intentions. At least two underlying principles support this notion.

The first reason is evident when you have personal behavioral control, because then the effort to successfully complete a task will increase and ultimately affect an actual behavior. Consider two people with similar intentions to learn how to drive a car, the person who believes he will successfully learn how to drive a car is more likely to succeed in the
behavior than the person with less confidence. The second explanation is linked to the fact that in some situations even if you have the intentions to act, you might not always be permitted to do so because of insufficient power to control the behavior. To exemplify the mentioned relation, consider a situation when a person has the intention to buy organic milk, however if the milk is not available in the supermarket the person will have no control of the situation. Thus, the low control of the situation is affecting the actual behavior (Manstead, 1996).

2.3.4 Environmental attitude models

Kaiser et al (1999) criticize the theory of reasoned action for not including moral dimension which is necessary when predicting ecological behavior. The underlying reason for this is simply that in ecological behavior literature the focus is not only of egoistic nature but also on the welfare for other people. This means that it is necessary to use a more adapted framework to suit the purpose of environmental attitude research. Furthermore, Kaiser et al (1999) argues that there exist a strong base of support in the belief that social thinking has a strong impact on environmental decisions, which further reinforce the need to include moral concepts into the environmental attitude model.

The research foundation regarding environmental attitude and the reasoning from different studies can be divided into three different approaches. It is important to take into consideration all these perspectives to attain an overall view of the environmental attitude concept and to determine the most relevant theory which best fit the intention with the authors’ thesis.

The newest approach is commonly described as the new environmental paradigm and has originally been developed by Dunlap and Van Liere (1978). The attitude model involves three factors in form of humanity’s ability to upset the balance of nature, the existence of limits to growth of human societies and humanity’s right to rule of the rest of the nature. The new environmental paradigm is built upon the supposition; “implicit within environmentalism was a challenge to our fundamental views about nature and humans’ relationship to it” (Dunlap, Van Liere, Mertig and Jones, 2000, pp. 427). The model has been used in various studies (Luzar, Diagne, Gan and Henning, 1995; Corral-Verdugo and Armendariz, 2000) to predict environmental behavior. However, we argue that the model itself does not contain a strong enough base in social psychology which is of great importance in the attitude concept and which we consider is necessary when predicting behavior.

Another approach which we refer to in our thesis as the attitude toward environment is based on the research by Maloney and Ward (1973) and Maloney, Ward and Braucht (1975). Their research which also measures ecological attitude and knowledge has been shown to be quite reliable (Synodinos, 1990). The research from Maloney and Ward (1973) has unfortunately not yielded results that indicate any relationship between fac-
tual knowledge and ecological behavior. The approach itself can be referred to as a multi-component approach and makes a difference between the cognitive, affective and intentional elements of attitude. The cognitive element measures the amount of knowledge an individual has about the environment. The affective element evaluates the individual’s feelings in regard to environment. The final component is a function of two factors in form of verbal commitment and actual commitment and corresponds to the individual’s intention to engage in certain behaviors (Maloney et al, 1975). As cited by Martin and Simintiras (1995) in their article about impact of green products they commented that although Maloney and Ward have a high reliability and validity when first introducing their model recent studies show that their knowledge scale is highly skewed, making the data collected useless. Since we find the knowledge component important for predicting ecological intentions we considered the model to be unfit with our purpose.

According to Olsen (1981) and Gamba and Oskamp (1994) as cited by Kaiser et al (1999) the reasoned action theory could be seen as a joint framework of the previous described environmental attitude models. In the light of this reasoning Kaiser et al (1999) have proposed a model based on the theory of reasoned action but modified it to include factors more relevant when determining environmental attitude and behavior.

All the mentioned environmental theories have been evaluated for the purpose of our thesis based on their usefulness in predicting intentions for purchasing environmentally friendly automobiles. Although, they all explain environmental attitude to some degree we have chosen the model that best fit the purpose of our research.

2.4 The proposed model

Since Kaiser et al’s (1999) model contains valuable components such as environmental knowledge, environmental values and responsibility feelings which we truly believe influences intentions when purchasing an environmentally friendly automobile we have considered it to be trustworthy and well suited for our thesis. This argumentation is based on the following reasons; first, in Kaisers et al (1999) model they unite the different perspectives of norm-activation theory and rational-choice theory by including responsibility feelings. We consider this as very necessary since much research that has been conducted on environmental attitude has advertised for the need to address moral dimensions that often is forgotten in environmental attitude models (Kaiser et al, 1999).

Second, It may be argued that Kaiser et al’s (1999) model was created in the late 1990’s and may for that reason not still be relevant since the students today were children when the model was constructed. However, we believe it remain relevant today because of the significance of the components it consist of and because the model is very well established and proven which many more recent model’s lack (Kaiser et al, 1999). The boom of environmental consciousness during the 2000’s have of course affected the atti-
tude towards the environment but the important concepts of environmental values, environmental knowledge and responsibility feelings still continue to be important. Kaiser et al (1999) have successfully incorporated the theories from previous environmental attitude and behavior models and provided a relevant model that is useful for predicting ecological intentions. The model has also been tested on two different populations on two different continents which indicate that it can be applied universally (Kaiser et al, 1999).

Third, the strong construct of the theory of planned behavior has been proved and supported in many studies which points further to the fact that the proposed model is appropriate (Ajzen, 1991; Godin and Kok, 1996). It has also shown a very good indication that it successfully can be modified and extended when including aspects of moral dimensions as seen in Masser, White, Hyde, Terry and Robinson's (2009) study about predicting blood donation intentions and behavior. This reinforces the notion that the model should be used when predicting intentions for purchasing environmentally friendly automobiles.

### 2.4.1 Environmental Knowledge, Values, Responsibility Feelings and Intentions

Kaiser et al (1999) mean that the three factors: environmental knowledge, responsibility feelings and environmental values should be used when predicting ecological behavior intentions. This in turn have an effect on the ecological behavior.

Kaiser et al (1999) argue that environmental knowledge is a precondition and an important component in order to form an environmental attitude of any kind. Within cognitive psychology they usually separate the concepts of systematic and action-based knowledge. Systematic knowledge usually corresponds to one's ability to know how ecosystems function. A good example that is commonly used to describe this type of knowledge is the relationship between carbon emissions and the green house effect. In this way systematic knowledge is very simplistic in its form due to the fact that it does not require deeper understanding of how your own behavior has an impact on the environment. Action-based knowledge is when a person understands how his or her's actions have an impact on the environment (Frick, Kaiser and Wilson, 2004). For example, the understanding that using an environmentally friendly car would produce less carbon emissions.

In the theory of planned behavior subjective norms are mediated by intention to predict behavior. In the abbreviated model by Kaiser et al (1999) they make use of environmental values as an approximation of subjective norms to predict ecological behavior. There are clear links between environmental concern and behavior which have been researched by Schwartz (1994). The findings from his research conclude that there is a high correlation between a person’s values and the commitment to proenvironmental actions. Therefore, there exist an apparent link between environmental values and eco-
logical behavior. This is supported by Vinson, Scott and Lamont (1977) who argue that an individual's values have a great influence on how he or she will act in different situations. For example, if a company can understand a customer's values the company can better match their services to the preferences of the customers.

Kaiser et al (1999) suggest the incorporation of moral dimensions into their ecological attitude model by combining norm-activation and rational choice theories. There are at least two reasons why to include a moral dimension. The first can be considered to be of a practical reason. The norm-activation model is the second most used model for describing environmental psychology and it conceptualize the importance of including moral norms when discussing environmental attitude. The second reason is more of a philosophical nature and incorporates two social norms in form of moral and conventional norms. These two norms are connected to two different social emotions, which are the feeling of shame when you dishonor conventions and feel culpable for abusing moral standards (Keltner and Buswell, 1996). Both norms contribute to engagement in ecological behavior but in different ways. Conventional responsibility refers to the adjustment in regards to indoctrinated norms that are socially accepted by the society. A person may act in conventional manners in order to receive approval from the surrounding environment. Since ecological behavior is often viewed as directly related to moral thinking, environmental responsibility is therefore perceived as moral-related. Cialdini and Goldstein (2004) propose the view that social norms only have an effect on our behavior when we are strongly aware of them. This means that our actions are unaffected by our norms as long as they are not deeply rooted in our consciousness.

According to Blake (1999) there exist some barriers to pro-environmental behavior. One of those barriers is personal responsibility which is related to the concept of locus-of-control, meaning that an individual cannot influence a situation by their own behavior and therefore act in a less pro-environmental manner. Thus, it is justified to include responsibility feelings it in the model (Kaiser and Shimoda, 1999).

Ecological behavior intentions are a central concept in the thesis as it is in theory of reasoned action proposed by Ajzen and Fishbein (1977). Ecological behavior intentions are in Kaiser et al (1999) model a function of responsibility feelings, environmental knowledge and environmental values. Thus, stronger intentions will increase the likelihood that the behavior will be performed.
2.5 Proposed Hypotheses

As a result of the presented research we assume that the following factors will have an impact on the ecological behavior intentions when buying an environmentally friendly automobile.

In line with the theory provided Kaiser et al (1999) and the reasoning given in earlier section we believe that responsibility feelings will have an effect on intentions when buying an environmentally friendly automobile:

\[ \text{H1: Responsibility feelings have a positive impact on the intentions to buy environmentally friendly automobiles.} \]

Environmental knowledge is another factor that has been correlated to ecological behavior intentions which we want to test in our research. We believe that the knowledge an individual have about the environment will affect the intentions related to buying an environmentally friendly automobile. This leads us on to the second hypothesis:

\[ \text{H2: Environmental Knowledge has a positive impact on the intentions to buy environmentally friendly automobiles.} \]

The final hypothesis we want to test in our investigation is related to environmental values and its affect on intentions towards buying an environmentally friendly car. We believe that values regarding the environment will correlate positively to intentions to purchase an environmentally friendly car. Our hypothesis is therefore formulated:

\[ \text{H3: Environmental values have a positive impact on the intentions to buy environmentally friendly automobiles} \]
3 Method

In this section the author’s method will be presented. First, the choice of subject will be presented followed by a presentation of the research approach. Since the research is of a quantitative character much effort will be given to explain the structure and design of the questionnaire as well as pretest of it.

3.1 Approach method and techniques

The idea for the thesis was founded during the Down to Earth project, which is a project initiated by Jönköping International Business School together with Umbilical Design. The aim of the project is to link space technologies to problems found on earth, by presenting how space missions deal with scarce resources. With the insight of the technology used in space, the project has the objective to deploy these technologies, concepts and ideas in various industries and inspire for new innovations in regard of environmental sustainability. The project has been implemented with various organizations in Sweden, ranging from large corporations to municipalities. The company in question was VCC, which we worked together with during a two day workshop. By combining knowledge from various fields of expertise, the project developed many innovative ideas in regard of environmental sustainability. However, little focus was given to understanding the consumer. What is the attitude toward green products and what are the underlying reasons behind it? Those thoughts resulted to our own research that we presented for VCC, who showed a great interest in our research. The thesis has been conducted with supervision from VCC and they have provided valuable insights into the market of environmentally friendly automobiles. The research has VCC’s full approval and they have worked as a collaborative partner for the thesis providing insights into the market of environmentally friendly automobiles. Since little research exists on Chinese environmental attitude and no research on Chinese citizens’ attitude towards environmentally friendly cars we find it of great value that this research area should be explored. Important to mention is that our thesis is meant to describe future trends in attitude which aims to predict environmental intentions among Chinese customers.

In the introductory stage of the thesis, an extensive literature review was conducted. Included materials were academic articles, specialist literature, newspaper articles and internet websites within the field of consumer behavior. Due to the fact that the thesis has an apparent focus on how an attitude may influence an individual’s intention, much effort was made to explore prior research in this area. Key words used when searching for relevant literature include: attitude-behavior relationship, environmental concern, ecological behavior, environmental sustainability, green marketing, green consumer, attitude in china and environment-china. In parallel with the literature review, we had a discussion together with VCC in order to get their opinion about the research. Their thoughts and insights were taken into consideration when formulating the purpose of
the thesis. In light of the explored literature, the theories and models that best suited the purpose of the research were chosen. Theories that were selected were also well cited and have acquired recognition in the academic context, which is vital in order to ensure the reliability of the research.

3.2 Research Approach

In order to fruitfully answer our research questions, we have chosen to use a causal research approach, which is a type of conclusive research where the major objective is to obtain evidence regarding cause-and-effect relationships (Malholtra, 2004). Causality is defined by (Malhotra, 2004, p. 204) as “when the occurrence of X increases the probability of the occurrence of Y”. However, it is important to bear in mind that a research project may serve many different purposes. Thus, it is not always distinct what research method to use, which stresses attention to grasp the nature of a specific problem. Our research revolves around what factors that influence individuals’ intentions and to examine the relationship between them. In line with the aim of the thesis our causal research approach is well chosen according to Malhotra and Birks (2007) who argues that a causal research approach is appropriate for determining the nature of the relationship between the causal variables and the dependent variable.

Since our thesis aims to explain the underlying elements of environmental attitude and the connection to ecological intentions we consider our research approach very well suited to our research. The chosen environmental attitude model that we intend to use originate from Kaiser et al (1999), which is a modification of the well used theory of reasoned action designed by Fishbein and Ajzen (1975; 1980). The model will test the correlation between intentions to buy environmentally friendly automobiles and three underlying factors that constitute an individual’s attitude toward the environment. These factors are; responsibility feelings, environmental knowledge and environmental values. Even though the theory of reasoned action has been revised, it still serves as a fundamental theory for research conducted in the area of predicting behaviors, especially in the field of green consumption. The theory has received great support and recognition since it was published in the 1980’s. Our chosen model is not yet as recognized as the original model, even though it has been the subject of significant tests and has proven to provide a conceptual model to predict ecological intentions. We find it very well suitable for our purpose.

3.3 Construct of Survey

To be able to retrieve as interesting and relevant data as possible we chose to collect primary data. This allows us to gather information for the single purpose of this research. In order to determine and analyze attitude among people a quantitative approach was chosen because of the creation of important segmentation that can be used
by VCC. Quantitative research approach allows measurements of usage and attitude in a very functional way which is most helpful in our research which centers on the environmental attitude concept (Bradley, 2010). Since we have chosen to use a quantitative approach an obvious research tool for our study would be a questionnaire. As our research is concerned with the attitude concept, the role of the questionnaire will be to provide a standardized format where the questions will be formulated in the same way to different people. Through this medium we can ask questions to the research subjects about factors relating to attitude and thereby facilitate the data collection (Brace, 2004).

The questionnaire is designed and performed in a way that will facilitate the collection of unbiased and accurate data. To ensure a high quality in our thesis we have decided to use a self-completion internet based survey which allowed us to avoid the possibility of the interviewer biasing the results. This presents several advantages because the respondents can answer the survey when they want and where they want. The method is also proven to remove the social desirability bias since there is no interviewer at the location (Brace, 2004). We believe that measuring environmental behavior may make respondents more susceptible to the social desirability bias and by using an electronic self-completion method we minimize the chance of that phenomenon. The choice of using an electronic self-completion survey was also based on the fact that it is relatively cheap, convenient and fast compared to other mediums (Malhotra and Birks, 2007).

### 3.4 Pretest

When designing a questionnaire it is important to assure that the questions are interpreted alike regardless of the respondent. The first draft of questionnaires tends to be too long and contain unclear, ambiguous questions. The objective of the questionnaire pretest is to eliminate those problems by identifying and correct the deficiencies (Aaker, Kumar, Day and Leone, 2011). Due to the fact that we are conducting our research on Chinese students who do not have English as their mother tongue language, it is increasingly important to eliminate language barriers and make the questionnaire more understandable by conducting a pretest.

When we conducted the pretests we tried to be as open minded as possible in order to accept the received critique. As Aaker et al (2011) suggest a rather small sample size is necessary for a pretest, especially when the questionnaire is short and straightforward, which we consider ours to be. Thus, we conducted our pretest on 15 people that represented our sample population, with respect to age and sex to receive a good overview of our pretest. When we conducted the pretest, we used a debriefing approach, which is a form of a personal interview pretest Aaker et al (2011). As proposed by the debriefing approach we let the respondent fill in the questionnaire without assistance. However, during the whole time we observed the respondents in order to detect confusion and also to time each section of questions. None of them should be too long in order to main-
tain the respondent’s attention. We set a maximum duration of 10 minutes of the questionnaire, none of the respondents in the pretest needed more time than the maximum duration. When the respondent had completed the questionnaire we went through all questions together and asked them about structure, phrasing, layout and whether any questions were misleading. This process was repeated with five respondents, all opinions were then considered and the questionnaire was revised accordingly. The first group of respondents expressed opinions about the language, some words appeared to be seen as difficult and not understood. These words were then changed to more simple words to increase ease of understanding. The same procedure was conducted two additional times until the test subjects found no misunderstandings in the questionnaire. When all opinions had been taken into account, we returned to the first step of the design process. Each question was reviewed and discussed in order to validate its place in the questionnaire. When all the steps were completed in the pretest, the purpose of it was fulfilled, to ensure that the questionnaire meets the researcher’s objective of the questionnaire (Aaker et al, 2011).

3.5 Design of the Questionnaire

Our questionnaire is introduced with a text describing the purpose of the research and the time it will take to complete it. To make the respondents feel comfortable taking the questionnaire we also guaranteed total anonymity. We wanted to inform about these issues in the beginning to increase the response rate and to give the respondents an idea what kind of time and effort engagement they committed to.

When writing the questionnaire we constructed it with the goal to make it as easy as possible to understand and that the respondents should feel as comfortable as possible answering it. When distributing the questionnaire to Chinese students it is important for us to make the questions clear and unambiguous to increase the ease of answering and understanding it. This is the prominent reason why we chose to pretest the questionnaire on three different groups before distribution. Moreover, when creating the questionnaire we designed it scientifically correct in line with the advices given by Malhotra and Birks (2007) where they promoted to avoid questions which the respondents cannot answer, are leading or double barreled. Furthermore, an attractive and clear questionnaire induces the respondent to answer it and thereby increasing response rate (Brace, 2004).

In our questionnaire we made use of attitude rating scales in form of a likert scale to address respondent’s attitude dimensions. We used 5 numbers of points on the scale since it gives adequate discrimination and is simple to understand (Brace, 2004). It may be argued that a 7-point scale is better because it can induce more variance in the results. However, the five point scale was used by the researchers that our own model is based on. By using the same rating scale our questionnaire can be considered well founded.
since it has followed the design of a fine conducted research, which also has the same nature of problem and purpose as we have. Thus, we considered it important to use the same rating scale in order to reassure the credibility of our own research. This choice was also reinforced by our pretest which showed that most Chinese respondents preferred a 5-point scale. We designed the questionnaire with structured questions and the force-response application which required the respondents to answer all questions in a battery in order to proceed. We did this to facilitate coding and analysis of the responses. The questionnaire denied the respondents headlines to the three batteries of questions to ensure they did not adjust their answers.

Finally, when designing the layout we tried to select the more interesting questions in the beginning and the more formal and uninteresting questions in the end of the questionnaire to increase response rate and stimulate the respondents performance, as suggested by Malhotra and Birks (2007). In line with this advice we divided the questionnaire into 6 different blocks of questions where we started with the more interesting questions and ending with less stimulating questions. Questions about the respondent’s backgrounds were considered as less interesting and therefore placed in the last block while questions concerning their knowledge and responsibility feelings were positioned in the beginning.

Our questions were based on already tested and well proven research by Kaiser et al (1999). However, in order to adapt the questionnaire to meet our specific purpose we improved the questions both in its content and the way the questions were phrased. The questions were constructed to grasp the respondents’ true feelings about the examined factors. To succeed with this significant work was done to ensure that the questions were understood and were measuring what they were intended to measure.

In the responsibility feelings battery, the questions were designed in order to capture the respondents’ moral dimension by using multiple questions measuring individuals’ responsibility feelings. In order to measure individuals’ moral dimensions we tried to ask questions that forced the respondents to take a stand about what is wrong and what is right related to the environment. By doing this with help from a likert scale we could get an indication about the responsibility feelings of the respondents.

The questions concerning environmental values were constructed to justly examine the respondents’ true values concerning the environment. Since values in general can be a sensitive matter it adds to the difficulty of the measurement. To avoid a low response rate and sensitive implications on this section we formulated rather simple questions that covered a wide spectrum of the individuals’ environmental values. For example, regarding individuals values about companies interaction with the environment, we measured what our respondents think about companies that exploit environmental resources for short term profits. This means that an individual can easily take a position when it comes to environmental values in this matter. It may be argued that our ques-
tions are general in the sense that all respondents will agree upon this kind of statements. However, we believe that the questions are motivated to use since western countries values are not a certainty to be universal across the globe, China in particular, where values are different from the western world.

The third battery of questions concerning environmental knowledge included eight questions which is more than in the previous batteries of questions. The reasoning behind this is that knowledge requires more questions in order to get a general estimate about what a person knows and does not know about the environment. It may be argued that it is difficult to measure knowledge by using a likert scale because the scale does not fully separate a correct answer from an incorrect answer. Since the scale points allow the respondent to be partly correct and partly incorrect it does not give the full picture of a respondent’s knowledge. But measuring factual knowledge on a scale give us a general indication what an individual knows about the environment and it give us a better measure of knowledge as a part of an individual’s attitude.

The final battery of questions related to our environmental model treated the aspect of our respondents’ intentions. We wanted to examine to what degree the respondents were willing to purchase an environmentally friendly automobile. In doing this we formulated questions where the respondents had to indicate to what extent they would be willing to give up certain attributes that a regular fuel driven car would possess in order to purchase an environmentally friendly automobile. In this manner the questions provides us with a comprehensive overview of the respondents’ intentions.

In our questionnaire we also included questions that were more specifically related to VCC and the automobile industry. These questions were included because of the importance to collect some general information concerning the attitude respondents had related to VCC. Furthermore, the questions can give insights and provide recommendations for VCC how to best seize the opportunity to become the market leader of environmentally friendly automobiles. The questions will indicate VCC’s current competitors on that market and what attributes are associated to VCC in the minds of potential consumers. See appendix A for the full questionnaire.

3.6 Research Data Collection

We managed to send out our questionnaire to all Chinese students studying at the University of Jönköping which amounted to 92 students. We received a very high response rate of 65% which is considered very well for a web-based survey. Furthermore, the population represents young Chinese students very well since they come from different parts of China. We chose to target Chinese students because they will become the future purchasing power in the country and therefore represent a very important group. However, our original idea was to conduct our research directly on the Chinese market targeting Chinese students studying at a partner university to Jönköping International
Business School. The Chinese university was located in Shanghai and named Jiao Tong University. Through a professor at our University we were able to establish contact with another Chinese professor at that university. However, due to authorization requirements at the Chinese university we were unable to send out our questionnaire as first intended. Therefore, we proceeded our investigation on Chinese students studying at the University of Jönköping. We located the names of all the Chinese students, both full-program and exchange via our international office. Afterwards, we sent out the questionnaire via E-mail containing a link to the web-based questionnaire.

The best possible solution to get the most accurate result to explain our research questions would be to carry out our research on Chinese students studying in various locations in China. This would further improve the generalizability of our study and better represent the population of China. According to Hair, Andersson, Tatham and Black (1992) it is wise to have 4-5 cases for each variable. Since we have 24 variables coming from four batteries of questions concerning responsibility feelings, environmental values, environmental knowledge and intentions (see appendix A) this means that the optimal sample size would preferably be at least 120 (24*5=120) in order to conduct an accurate factor analysis. Furthermore, to increase the response rate and increase the awareness of the questionnaire the optimal solution would mean to be present at all the locations where the questionnaire is distributed in order to market it in a sufficient way. However, several implications restrained us from reaching the optimal sample.

First, since the students from China studies at a Swedish university it may affect their knowledge about Swedish companies operating on the Swedish market. Since we are working together with VCC which is Sweden’s largest car manufacturer it is very likely that the Chinese students have been exposed to the company through commercials or other marketing communications. However, we do not believe that this exposure will have a negative effect on our research since VCC is a global company that already operates on the Chinese market and is very well recognized.

Second, many of the exchange students have spent more than a few months living in Sweden when answering the questionnaire. It can be argued that this may affect their way of thinking when completing the questionnaire because of their knowledge about Swedish culture and values. While this may be true we still believe that our sample still represents young Chinese students since it is well known that Chinese individuals’ have a tendency to uphold their cultural values.

Third, since our questionnaire originally was supposed to be sent out to over 1000 students in a university in China but now only was sent out to 92 Chinese students studying in Sweden it could be argued that it decreases the ability to generalize the results of the research. This is scientifically true according to Malhotra (2004), however, we still have a large enough sample to make assumptions, interpret indications and make conclusions. Our original intention were to send out the survey to a university in Shanghai but
now when we changed sample we have a better coverage of the Chinese populations since many of the students in our university comes from parts all over China. Furthermore, since we sent out the questionnaire to students studying at a Swedish university it was much easier to influence the response rate. This allowed us to send out reminders to the Chinese students regarding the survey which may not have been approved in China. According to Malhotra (2007) it is difficult to achieve a high response rate with a web-based questionnaire. We managed to reach a response rate of 65% which considering the circumstance is high.

3.7 Data Quality

3.7.1 Reliability

“Reliability is the extent to which a measurement reproduces consistent results if the process of measurement were to be repeated” (Malhotra and Birks, 2007, pp 159). In other words it measures the extent to which the results can be consistent if repeated measurements were made. The method applied in our research to increase the reliability of the measurement was to ask numerous similar questions that measure the same underlying parameter. For example each battery with questions represents the factors that we believe have an influence on individual’s intention to buy environmentally friendly cars. The questions from each battery deal with the same underlying parameter, but covering different aspects of it. By using this method, we achieved a high reliability by disclosing the consistency of the results. In order to reassure a high reliability we have chosen to make use of fixed response alternatives to be able to minimize the risk of random error.

Since our research consisted of closed questions it secures a higher reliability than open questions, because of the predetermined answers. Furthermore, it is important to bear in mind that a possible language barrier may exist. Since our questionnaire was conducted in English it may be argued that the Chinese respondents could have misinterpreted the questions resulting in a lower reliability. In order to reduce the risk of misunderstanding we pretested the questionnaire on 15 Chinese students who have Chinese as their native language (see section 3.4). We tested the reliability using Cronbach’ Alpha test, which measures internal consistency, where all but one batteries received a Cronbach’s Alpha higher than 0.7 which indicate a satisfactory reliability. To further increase the reliability we have based the questions used in our questionnaire on the recognized research from Kaiser et al (1999). We believe that this strong theoretical construct with already tested questions reinforce the reliability of our own research.
3.7.2 Validity

Even if reliability is necessary, it is not sufficient for validity which can be described as “the extent to which a measurement represents characteristics that exist in the phenomenon under investigation” (Malhotra & Birks, 2007, pp 159). This means that a measure has a high validity if it measures what it is supposed to measure. In our case, it is of great importance to achieve a high validity in order to ensure that the differences in the attitudes measurements are true differences that reflect differences between individuals on the characteristics being measured. If this is not achieved it is very troublesome, since the result will demonstrate a false reality.

Being able to have a high validity of a questionnaire is vastly dependent on the awareness of the factors that may have an impact on the result. Furthermore, you should have a clear understanding of the population that is to be investigated. Validity of a questionnaire is in high regards concerned about to reduce errors, this can be done by asking the right questions, avoid confusions in the language and also avoid leading or biasing questions. It is also vital to avoid generalizations and estimates in all questions, in order to eliminate the risk of forcing the respondent to make their own assumption what you are actually asking (Malhotra & Birks, 2007). We have successfully completed pretests to correct much confusion in the language as well as managed to avoid many leading or biasing questions. Due to cultural differences it was important to acquire a clear understanding of the investigated population. This led us to conduct much research on Chinese attitudes and cultural dimensions in addition to the aforementioned pretests.

According to Malhotra (2004) internal validity refers to what extent the independent variables cause an effect on the dependent variable. In order to achieve a high internal validity, we have tried to control the external variables by sending out the questionnaire at the same time and give the respondents the same instructions. Furthermore, we also conducted numerous pretests to ensure that the questions were well formulated in order to avoid respondents to make their own generalizations or estimates.

Unfortunately, we had no possibility to influence the setting in which the respondents took the questionnaire and what distractions that may have been evident. Furthermore, we had no control if the respondents discussed the questions with friends before answering the questions. This may have caused a biased result. However, we do not consider this to have any significant affect on the result. Thus, it is assumed that we have a high internal validity in our research.

3.8 Statistical Methods used in the Analysis

The data we collected from our questionnaire was analyzed with help from the statistical software program SPSS where we conducted several analyses with different statistical methods.
In SPSS we started with extracting some general information about the data we had collected in order to receive an understanding about what kind of data we were dealing with. Therefore we conducted some univariate analyses in form of frequencies where we easily could see how the distribution was among gender, age and other variables.

After completing the univariate analyses we conducted a factor analysis in order to reduce the number of variables in our questionnaire. By the use of fewer variables you can more accurately perform multivariate regressions that easier explain the relationship between the independent and the dependent variables. The variables that are connected can be replaced by a factor representing those variables, which we did in form of factor scores. This can later be used in a subsequent regression analysis in order to facilitate the research.

Finally, we used a regression analysis which is a statistical procedure for analyzing relationships between dependent variable and one or more independent variables (Malhotra, 2004). Since we searched for a connection between one dependent variable with some other independent variables which the regression analysis helped us with according to this formula:

\[ Y = a + b_1X_1 + b_2X_2 + ... + b_pX_p \]

Where \( Y \) is the value of the dependent variable and \( a \) is the intercept. Furthermore, \( b_1 \) represents the slope for the first independent variable and \( X_1 \) is the first independent variable that explains the variance in \( Y \). The \( b_p \) represents the slope for each \( X_p \) or independent variable that is included in the multivariate regression equation.
4 Results

In this chapter we will present the empirical evidence of our investigation. The evidence has been constructed with assistance of the SPSS software. We will start by presenting general descriptive of relevant variables, which is followed by factor analysis and regressions.

4.1 The sample

The number of answers coded in our data amounted to 60, there are certain numbers of non-respondents to individual questions. Thus, we report the number of valid answers in the tables below. The respondents from our investigation concluded an almost even distribution between genders with 27 male and 32 female as table 4.1 indicates. The age distribution was prominently dominated by respondents aged in the group 19-24 which represented a frequency of 52 respondents. There were only one respondent that was 18 or younger and 6 respondents that were 25 or older, which can be seen in table 4.2

Table 4.1 Gender Distribution

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>27</td>
<td>45.8</td>
</tr>
<tr>
<td>Female</td>
<td>32</td>
<td>54.2</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.2 Age Distribution

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 and younger</td>
<td>1</td>
<td>1.7</td>
</tr>
<tr>
<td>19-24</td>
<td>52</td>
<td>88.1</td>
</tr>
<tr>
<td>25 and older</td>
<td>6</td>
<td>10.2</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.2 Environmental car ranking

The result from the question regarding how the respondents perceived different brands environmental friendliness was represented as a ranking scale where a low number indicating higher ranking, meaning that a high ranking results in a lower mean value. This
means that the car brands are ranked on a scale from 1-5, where 5 is the lowest rank and 1 is the highest rank. As table 4.3 indicates there is a strong tendency that Toyota is considered to be the most environmentally friendly car brand with a mean value of 1.85. VCC was ranked in second place with a mean value of 2.13. For full presentation of the results see table 4.3.

Table 4.3 Rank of perceived environmental friendliness of car brands

<table>
<thead>
<tr>
<th></th>
<th>Toyota</th>
<th>Volvo</th>
<th>Audi</th>
<th>BMW</th>
<th>Mercedes</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>Mean</td>
<td>1.85</td>
<td>2.13</td>
<td>3.44</td>
<td>3.50</td>
<td>4.07</td>
</tr>
</tbody>
</table>

4.3 Attribute Ranking

In our attribute ranking we wanted to show the attributes that are most associated with the brand of VCC. We asked our respondents in the questionnaire to rank the different attributes on a scale from 1-5 where 1 is the highest rank and 5 is the lowest rank. What can be depicted from the information given from table 4.4 is that the strongest attribute that characterize VCC among the Chinese students was the safety which has a mean value of 1.45. Precedent result is closely followed by the attribute of quality which amounted to 1.83. Environmental friendliness received a third place on the ranking and was followed by performance and finally design. In our empirical evidence we also found that 74% considered VCC to be an environmentally friendly brand which can be viewed in appendix B.

Table 4.4 Attribute ranking

<table>
<thead>
<tr>
<th></th>
<th>Safety</th>
<th>Quality</th>
<th>Environmental friendliness</th>
<th>Performance</th>
<th>Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Valid</td>
<td>58</td>
<td>58</td>
<td>58</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>Mean</td>
<td>1.45</td>
<td>1.83</td>
<td>3.66</td>
<td>3.91</td>
<td>4.16</td>
</tr>
</tbody>
</table>
4.4 Attitude Variables

4.4.1 Responsibility feelings

The results from the battery of questions concerning responsibility feelings can be found in table 4.5. The number of valid responses is 60 except for one item, which has 59 responses. The respondents were handed questions that used a likert scale to indicate the level of agreement or disagreement with statements regarding responsibility feelings. As seen in table 4.5 all questions have a rather high mean value, which indicate that the respondents have noteworthy responsibility feelings for the environment. Important to notice is that the question “In my point of view CO₂ emissions is not something I feel responsible for” was reversed in coding. We included questions of negatively phrased character in order to detect the respondents’ responsiveness to the questions. However, when interpreting the results it was easier for us to reverse the answers in coding meaning that if someone answered the lowest value on the likert scale it gets reversed to the highest value. Remarkable is also the difference between respondents’ answers in question 2 and 3 where they feel less responsible for polluting the air compared to the release of CO₂ emissions despite the fact that they are practically measuring the same variable. Since question 2 was negatively phrased, this could have caused the difference in the mean value.

<table>
<thead>
<tr>
<th>Responsibility Feelings</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I consider myself at least partly responsible for contributing to the greenhouse effect.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>In my point of view CO₂ emissions is not something I feel responsible for.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Driving an environmentally friendly automobile would make me feel less guilty of leaving the earth in good shape for future generations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N Valid</td>
<td>60</td>
<td>60</td>
<td>59</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Mean</td>
<td>4.08</td>
<td>4.22</td>
<td>3.47</td>
<td>3.82</td>
<td>4.20</td>
</tr>
</tbody>
</table>

4.4.2 Environmental values

The results from the likert scale questions concerning environmental values are shown in table 4.6. As can be viewed from the table all the questions except one received 60 valid answers. Tendencies that can be depicted from the results are that the respondents can be considered to have high values concerning the environment. All questions have a
mean value above 4, which must be considered to be very high. Worth to mention is that question 4 and 6 are negatively phrased and also reversed in coding. This could have caused them to receive the highest mean value as in the previous presented results for environmental responsibilities.

Table 4.6 Environmental values variables

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Values</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 I feel upset when companies emit large quantities of CO2</td>
<td>60</td>
<td>59</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Mean</td>
<td>4.47</td>
<td>4.51</td>
<td>4.73</td>
<td>4.10</td>
<td>4.52</td>
<td>4.67</td>
</tr>
</tbody>
</table>

4.4.3 Environmental knowledge

The results from the likert scale regarding environmental knowledge can be viewed from table 4.7. What can be interpreted from the results is that there is in general a relatively high mean for all the questions except for questions 6 and 7 with a slightly lower mean. This indicates that the knowledge about the environment seems to be in general high among Chinese students. Important to notice are the negatively phrased questions which have been reversed in coding, these are questions 3 and 7. The number of valid questions amounts to 59 for all questions except one.

Table 4.7 Environmental knowledge variables

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Q6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental knowledge (1/2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1 Automobiles are a contributing factor of CO2 emissions</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td>59</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>4.27</td>
<td>4.05</td>
<td>4.32</td>
<td>3.97</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Environmental Intentions

When the cost for an environmentally friendly car was higher than the cost of a regular car the mean value was 3.76, which can be seen in table 4.8. Similar results are found for the variables of lower performance and less appealing design which corresponded to 3.46 and 3.68. The variables with the lowest mean value were lower quality and less comfortable. This indicates that quality and comfortability are something that the respondents are not willing to sacrifice when purchasing an environmentally friendly automobile. The number of valid respondents amounts to 59 for all questions.

Table 4.8 Intention variables

<table>
<thead>
<tr>
<th>Intentions</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I would buy an environmentally friendly car even if the quality is lower than a regular car</td>
<td>3.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if the performance is lower than a regular car</td>
<td></td>
<td>3.46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if it is less appealing</td>
<td></td>
<td></td>
<td>3.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if it is less comfortable</td>
<td></td>
<td></td>
<td></td>
<td>2.92</td>
<td></td>
</tr>
</tbody>
</table>

4.5 Factor Analysis

Our questionnaire was designed to be able to conduct a factor analysis on each battery of questions concerning environmental knowledge, environmental values, environmental responsibility and intentions. We used the extracted components from the three batteries of questions as independent variables and the extracted component from intentions as the dependent variable. The method used was principal component analysis (PCA) and rotation, Varimax. For more information regarding factor analysis see 3.8. We used Varimax rotation because of the fact that we have four batteries measuring different concepts which the method handles well. We programmed SPSS to extract factors
with an Eigenvalue larger than 1 using Kaiser's criterion. According to Kaiser's criterion only factors with a value larger than 1 are kept for later measurements. The Eigenvalue represents the variance of each factor included in the factor analysis. In order to strengthen the decision more we also added a scree test to get a graphical view of the factor analysis. The scree test plots the eigenvalues of each factor which allows you to detect visually what factor to retain for further analysis. Recommendations given by Cattell (1966) state that factors above the elbow or break which can be seen in the plot (see Appendix C) are to be included. The factor scores were saved as new variables which we further used for the regression analyses.

We conducted our factor analysis on our 60 respondents and tested the batteries concerning environmental knowledge, environmental values, responsibility feelings and intention in order to find any underlying dimension to reduce the number of variables in our research. The negatively formulated items were reversed in coding.

Table 4.9 Factor loadings from environmental responsibility variables

<table>
<thead>
<tr>
<th>Question</th>
<th>Factor 1</th>
<th>Factor 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I consider myself at least partly responsible for contributing to the greenhouse effect.</td>
<td></td>
<td>.753</td>
</tr>
<tr>
<td>I feel personal responsibility for polluting the air.</td>
<td></td>
<td>.704</td>
</tr>
<tr>
<td>In my point of view CO2 emissions is not something I feel responsible for.</td>
<td></td>
<td>.608</td>
</tr>
<tr>
<td>Driving an environmentally friendly automobile would make me feel less guilty of driving</td>
<td></td>
<td>.852</td>
</tr>
<tr>
<td>I feel personal responsibility to leave the earth in good shape for future generations.</td>
<td></td>
<td>.791</td>
</tr>
</tbody>
</table>

The factor analysis of the environmental responsibility variables was conducted and resulted in two factors, which both monitors the respondents' responsibility feelings. In table 4.9 you can find the questions that were aligned with the two factors that were extracted from the test. The factor loadings correspond to the correlation coefficients between the variables and the factors and are the foundation when attributing a label to different factors. We have also included the factor loadings where you can see a clear difference between the two created factor scores. The first factor score is concerned with
questions relating to pollution or CO₂ emissions. The other factor is more related to feelings of guilt making the two factors distinctly separated from each other.

Table 4.10 Factor loadings from environmental values variables

<table>
<thead>
<tr>
<th>Question</th>
<th>Factor Values 1</th>
<th>Factor Values 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>The environment is worth preserving</td>
<td>.875</td>
<td></td>
</tr>
<tr>
<td>Future generations should have access to a healthy environment when they grow up</td>
<td>.835</td>
<td></td>
</tr>
<tr>
<td>I feel upset when companies emit large quantities of CO₂</td>
<td>.812</td>
<td></td>
</tr>
<tr>
<td>I feel upset when companies or governments exploit the planet's natural resources for short-term profits</td>
<td>.728</td>
<td></td>
</tr>
<tr>
<td>I do not care for the environment</td>
<td>.824</td>
<td></td>
</tr>
<tr>
<td>Environmental issues are greatly exaggerated</td>
<td>.736</td>
<td></td>
</tr>
</tbody>
</table>

The second factor analysis that was conducted on the environmental values question battery also resulted in the creation of two factors as shown in table 4.10. The questions in environmental values 2 were reversed in coding because of the negatively formed phrasing. In the table it is clear that there exist underlying dimensions connecting the different variables. For the second factor the underlying dimension is that the questions have been reversed in coding and that they are relating to your relationship with the environment.
The third factor analysis was conducted on the battery of questions that were concerned about environmental knowledge and resulted in two extracted factors as table 4.11 shows. The questions in the environmental knowledge factor 2 were reversed in coding due to their negatively formed phrasing which may have resulted in the separation between the two factor scores. As can be seen in the table the factor loadings are very much acceptable and ready to be used in consequent regression analysis.

The final battery of questions concerning the respondents’ intentions resulted in only one extracted factor. This has greatly facilitated the regression analysis since we only needed one dependent variable in subsequent analysis. However, we did exclude one question because of ambiguous phrasing. We decided to exclude the question “would you buy an environmentally friendly car even if the cost is equivalent to a regular car” because it was different in its character since all the other questions required some kind of sacrifice. The questions in the factor are found in table 4.13.
4.6 Cronbach’s Alpha test

In order to test the internal consistency of our questionnaire we applied Cronbach’s Alpha test with an acceptance level of 0.6 as recommended by Malhotra (2004). All but one battery of questions had an Alpha score above 0.6, as table 4.12 shows. In general the Cronbach’s alpha will increase when the intercorrelation between the test variables increase, indicating a high internal consistency.

Table 4.12 Cronbach’s Alpha scores testing internal consistency

<table>
<thead>
<tr>
<th>Question battery</th>
<th>Alpha score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental responsibility</td>
<td>0.517</td>
</tr>
<tr>
<td>Environmental values</td>
<td>0.754</td>
</tr>
<tr>
<td>Environmental knowledge</td>
<td>0.737</td>
</tr>
<tr>
<td>Intentions</td>
<td>0.773</td>
</tr>
</tbody>
</table>

4.7 Regression Analysis

To be able to test our hypotheses we have performed a multivariate linear regression analysis with the stepwise function, testing how much each of the independent variables explains the dependent variable. When using a stepwise regression the variables are tested separately instead of forcing them into the regression. From our factor analysis we extracted 7 variables from which 6 were accounted as independent variables representing the different batteries of questions. However, since the Cronbach’s Alpha value was lower than 0.6 for the environmental responsibility feelings battery some research argue that it should be excluded (Malhotra, 2004). Since our research is partly exploratory we argue that an Alpha level of 0.517 could be used but it is important to bear in mind the difficulty to generalize the result. George & Mallery (2003) have provided some general guidelines when interpreting Cronbachs’ Alpha values. They infer that a value of 0.5 is poor but not unacceptable when conducting further analyses.

In order to evaluate our proposed model we have checked the R square, which indicates the proportion of variance in the dependent variable (intentions) that is explained by the model. In our model we have a very low R-square value, with a measure of 0.087. This measure indicates that the model does not fit the data very well.

The results from the model indicated one factor with a high β-value which explains that this factor influences the dependent variable. The β-value is the slope of the independent variable; it represents the expected change of the dependent variable when the in-
dependent variable is changed by one unit at the same time as the other variables are held constant. From the regression analysis environmental values factor 1 was the only significant independent variable with an unstandardized $\beta$-value of 0.304 and standardized $\beta$-value of 0.313 on $\alpha$=0.05, sig. 0.019 which indicate a strong correlation between environmental values and intention. See appendix D for full details.

We conducted many regressions with different variable using different methods in order to find comprehensive evidence about more significant variables that could be found from the data. Instead of using the extracted intention factor as the dependent variable, we also tested all our factors scores as independent variables using multivariate regressions against each variable concerning intentions. In those regressions we found that the factor environmental values 2 was strongly correlated to the questions concerning quality and design. The factor score turned out to be significant against both quality and design as dependent variables. To confirm the significance we also conducted separate tests for the factor environmental values 2 and the concerned dependent variables with great success, the testing confirmed our results from the multivariate regression analysis. See appendix E for details.

In order to test the robustness of the model when incorporating environmental values 2 against the dependent variables concerning quality and design we also included another independent control variable in form of gender. In this test gender also turned out to be significant while increasing the significance of our factor score. These results indicate as already proven a strong connection between environmental values 2 and intentions. See appendix F for full details. As figure 4.1 indicates only one factor proved to be significant for ecological behavior intentions.
This means that from our three hypotheses only one was accepted.

**H1:** Responsibility feelings have a positive impact on the intentions to buy environmentally friendly automobiles.

*Rejected*

**H2:** Environmental Knowledge has a positive impact on the intentions to buy environmentally friendly automobiles.

*Rejected*

**H3:** Environmental values have a positive impact on the intentions to buy environmentally friendly automobiles.

*Accepted, $\alpha = 0.05$, using Environmental values factor 1*
5  Analysis and Discussion

In this section we will provide an analysis and discuss the results that have been provided from research. We are going to analyze each of the different components in our model starting with responsibility feelings and ending with some general discussion around the results.

5.1  Responsibility feelings

Responsibility feelings as proposed by Kaiser et al (1999) would be the necessary factor representing the moral dimension to predict ecological behavior. From our findings we could not interpret this dimension to significantly influence intention among Chinese students when it comes to predicting intentions for purchasing environmentally friendly automobiles. We believe that there are several factors that may have come into play here which affected the results of our research. First, there are reasons to suspect that the respondents in our survey may adapt according to the social norm. Second, we believe that respondents may answer in a way according to the belief that their actions have no affect on the outcome. Third, people that are not aware of moral norms are not affected by them. Fourth, we have a cultural difference which we believe may be able to have an impact on the results of our research.

As mentioned in our theory by Kaiser et al (1999) and Keltner and Buswell (1996) the moral dimension has been argued to be included in the ecological attitude model based on the reasons that it is widely used when describing environmental psychology and that it incorporates two important social norms. The conventional responsibility refer to the individuals wish to be socially accepted by its surrounding. This means that conventional responsibility influences individuals to act in a manner that he or she believes is expected of them. However, with this in mind it can also be interpreted that the respondents in our survey may have been influenced by the conventional responsibility to respond in a way that is inconsistent with their personal preferences in order to adjust in line with the norms in our society. This means that even if the results did not imply that the factors of responsibility feelings had any influence on the intention there is still not evidence enough to completely neglect the possibility that the factor could be significant in another study.

In our theoretical framework section we discussed that there exists some barriers in order for people to engage in pro-environmental behavior. The perception that one cannot influence a situation by their own behavior influences people to act in a less pro-environmental manner (Blake 1999). The implication of this in our research is that people may answer in a certain way because they do not believe that their own action will have any effect on the outcome. Thus, the respondents in our survey may believe that their influence on the environment may not be enough in order to justify a change in
their behavior. For example, when driving an environmentally friendly car this may appear as an insignificant change for the environment since your action will not have a direct visible effect. It may be argued that in order to reach a direct visible effect the whole population needs to change the behavior.

As discussed in the theoretical framework social norms may only have an impact on our behavior when they are deeply rooted in our consciousness as argued by Cialdini and Goldstein (2004). It may be argued that the absence of social norms when it comes to environmental concern among Chinese students inhibit the prediction towards intention for environmentally friendly automobiles. Furthermore, criticism can be made against the chosen model because it was developed in the 1990's and has therefore become outdated. This means that many of the respondents in our survey were only children when this model was developed and may for that reason not be appropriate for this generation. However, we believe that our chosen model still provides a thorough foundation for predicting environmental intentions. The model by Kaiser et al (1999) still incorporates what makes up an attitude, but the model may need some modification in order to adapt to the changes that have been evident after the environmental boom. What was self-evident in the 1990’s may not be true today even if many of the important elements of an attitude remain the same.

We believe that cultural differences may also have been a contributing factor to our result. Kaiser et al (1999) made their survey on the European and the American market. Since the difference in lifestyles between Chinese and western countries may have decreased in recent years cultural patterns still have an impact on the actions and beliefs of these individuals. Even if the Chinese students that have participated in our questionnaire have been living in Sweden for some time, their heritage may still remain evident when answering the questions in our survey. As part of cultural dimensions, one reason for our result can be Chinese individuals’ tendency to answer questions in a certain manner in order not to lose face, accuse or insult another individual. As mentioned by Malhotra and Birks (2007) consumer responds using their cultural frame of reference which was obvious in our results. We found that 10% of the respondents had answered that they were unfamiliar with VCC but at the same time considered VCC to be environmental friendly brand. The reason for this could be that the respondent did not read the questions accurately or avoided taking a stance for their personal belief. This also applies to all our questions.

5.2 Environmental Knowledge

As our model and theory proposed environmental knowledge was argued to have a strong connection to the behavior intention of individuals’. Kaiser et al (1999) argue that environmental knowledge should play an important role in order to form any kind of environmental attitude and should also explain much of the variance of ecological be-
behavior intentions. However, in our research we found out that the coefficient of determination $R^2$, which represents the amount of variability that can be explained by the model was very low and this applies to all the components. Moreover, the factor did not either have any significant correlation with the purchase intention variable which points to the fact that the results of our research contradicts much of the results that Kaiser et al (1999) have found out in their study. In their research they found that environmental values and environmental knowledge together could answer for up to 40% of the variance in ecological behavior intention.

The results from our regression analysis turned out to be interesting mostly because the mean values of the different question variables were very high as can be viewed in table 4.7. From our reasoning throughout our thesis we have believed that environmental knowledge should have an influence on ecological purchase intentions. Our results appear to be inconsistent with our reasoning and the theories that we have presented in our theoretical framework section. Our reasoning was based upon the notion that environmental knowledge was the foundation in order to make up any kind of attitude (Kaiser, Wölfling and Fuhrer, 1999). It may be argued that environmental knowledge should be measured using other types of questions such as multiple choice or open questions. These alternatives would not be appropriate due to the difficulty of interpreting and generalizing open question and the model is based on the attitude concept with the use of a likert scale. Moreover, Kaiser et al (1999) mentions that the concept of environmental knowledge varies depending on which statistical technique that is being used. This can have some explanation value when looking at the results presented in our thesis since our findings differ significantly.

Furthermore, in our theory section we discussed the difference in cognitive psychology between systematic knowledge and action-based knowledge (Frick, Kaiser and Wilson, 2004). Systematic knowledge is more superficial knowledge and is very simplistic in its form while action-based knowledge is deeper and involves an understanding about how an action can cause consequences. In our questionnaire we involved more systematic knowledge based questions than action-based knowledge questions which may have caused a skewed response from our respondents and could have influenced our environmental knowledge factor to become insignificant. It could therefore be argued that to better capture our respondents knowledge it would be wise to use more action-based knowledge questions. For example, to ask questions that really puts the respondents on the spot to understand and reflect on a problem that may not be evident at a first glance.

Ajzen (1980) argues that intention represent the motivational commitment that affect behavior. In line with this reasoning stronger intention would therefore predict a greater likelihood of performing the specific behavior. In this model intentions serves as a function of subjective norm and attitude towards a behavior which is very important in the theory. As explained by Ajzen (1980) the subjective norm is explained as the influ-
ence of the surrounding environment, largely by for example family and friends. Attitude towards a behavior is the personal favor or disfavor to a certain kind of activity. Instead of using the environmental attitude model by Kaiser et al (1999) it could be proposed that a better model for our research would be the theory of planned behavior provided by Ajzen (1991). This model may have some better explanation power that relates to the concept of attitude. As already mentioned in our theory section the theory of reasoned action and the theory of planned behavior have been widely recognized for predicting behavior and have been supported in many studies.

In our theoretical framework we referred to Kaiser et al (1999) and how they proposed that the concept of environmental knowledge corresponded to the factual knowledge of the environment and were argued to be more comprehensive concepts than attitude towards the behavior and subjective norms. This substitution could be motivated due to the hazards of measuring knowledge when using a scale which is confirmed by Maloney and Ward (1975) which study have been criticized because of the heavily skewed research component environmental knowledge (Martin and Simintiras, 1995). This implicate that using a scale involves a risk of not capturing the real knowledge of the measured variable. Our interpretation of the knowledge variable was that the results were in general high but since our results show no significant influence on intention (see appendix C) one can argue that the factor of environmental knowledge should not be included in the model. We believe that a good substitute would in that case be to include attitude towards the behavior from Ajzen and Fishbein’s theory of reasoned action (1975; 1980) since knowledge is a prerequisite of any attitude as proposed by Kaiser et al (1999) but attitude is an easier measured variable to put on a scale.

Purchasing an automobile involves investing a substantial amount of money. For young Chinese individuals the purchase might be the largest investment in their young life. Moreover, an automobile can be seen as a self-expressive product that allows an individual to express their personality by the use of a specific type of automobile. Inherent with this logic the decision process is prolonged due to the importance of the purchase. To use attitude toward the behavior instead of the knowledge component currently used in our model would shift the focus from the knowledge dimension to the attitudal dimension, which could be argued to be more appropriate when measuring intention to purchase an environmentally friendly automobile.

5.3 Environmental Values

Environmental values was the only factor of the ones presented in our thesis that turned out to be significant. According to our theory there is supposed to exist certain connections between environmental concern and behavior. Schwartz (1994) concludes that there exist strong correlation between individuals’ values and their commitment to pro-environmental actions. This notion is strongly supported by our research with a signifi-
cance of 0.019. Our $R^2$ value from the regression analysis did unfortunately leave us with a very low explanation value which indicate that the model explain very little of the variance. This means that there may be other variables that can be included that better explain the environmental purchase intentions. However, the results indicate a strong base for supporting the belief that environmental values indeed affect individuals’ intentions.

Our findings shed light on the already researched area of consumer behavior where personal values play an important role when predicting behavior. As mentioned in our theoretical framework individuals’ attitudes are based upon their values and if those values are changed this will have an impact on their behavior (Vinson et al, 1977). This emphasizes on the importance of including an environmental value component when conducting environmental attitude research. Personal values are fundamental when forming an attitude and are something that is deeply rooted in one’s personality.

Another reason why personal values have a significant impact on a person’s intention could be motivated in the value expressive functions proposed by Katz (1960). In his article he suggests that products can be expressed as an extension of oneself thereby becoming value expressive. This means that if an individual consider himself as a green consumer and having proenvironmental values this person will buy an environmentally friendly car not only for its features but also to express his identity through the automobile. However, the research conducted by Kaiser et al (1999) used samples from two western countries which could be argued to have an impact on the results concerning values in the surveys. By own experience the Chinese country is characterized by strong hierarchical tendencies both in the social sphere as well as in the professional sphere which is apparent in their society. China is also characterized by a trust to authorities which have a great influence throughout the country. Since western and eastern values differ cultural wise it could be argued that the model needs to be adjusted to more carefully consider the core values in the Chinese culture.

We mentioned in our theory that personal values could be described as underlying beliefs which is consistent and stable across time, and that value systems are organized beliefs that revolve around specific end-states which are measured along an importance scale (Williams, 1979). The implications of our results reinforce the proposition that personal values inherit a strong ground of influence with regard to intention. A contributing reason to the fact that environmental values was significant may very well be that even implicit environmental values serve as a deep rooted foundation for influence on intention.

Finally, what is really interesting is that when we included the independent variable gender together with environmental values in our regression analysis our results turned out to be even more significant which further support the notion that environmental values is a stable component.
5.4 Concluding analysis

As argued by Farla and Dijst (2009) consumers are today ready to change their behavior and buy environmentally friendly products. However, the consumers are not willing to make sacrifices on features that they find important. Our research support this belief and show strong evidence that young Chinese consumers are in general positive toward environmentally friendly cars and are ready to renounce on the design, performance and price. All those attributes received high mean values. However, the respondents showed less inclination to give up on attributes such as quality and comfort-ability, which both received low mean values. Quality and comfortability are considered to be something fundamental and necessary when deciding on what automobile to purchase. Since an automobile must be seen to be a high involvement product, due to both the financial and identity risk that is involved with the product it is logical that you are not willing to make sacrifices on the most fundamental attributes. When purchasing an expensive automobile, quality and comfortability are seen as a certainty and something that the consumers count on.

Moreover, performance and design are attributes that are seen as something extra. Noteworthy is that young Chinese consumers were willing to purchase an environmentally friendly automobile although it cost more than a regular car, indicating the respondents to be modest price sensitive. It could be argued that this is a result from the economic boom that has been evident in China as mentioned in 2.1. However, we do not know to what extent they would be willing to pay extra for an environmentally friendly car. It would be interesting to investigate this further in order for VCC to better understand what factors that causes the Chinese consumers to be less price sensitive and also discover the optimal price for increased profitability.

The fact that Chinese consumers are willing to sacrifice the design and performance of the car to make it more environmentally friendly can be considered to be something positive for VCC since the respondent ranked design and performance as the least common characteristics. This is a really interesting finding that if used correctly can be very useful when determining future research and evaluating investments. Another finding from our results was that safety was the attribute that was considered most associated to VCC.

Another interesting finding that can be considered to be relevant is the fact that environmental friendliness was ranked as the third most common characteristic, while at the same time 73% found Volvo to be environmentally friendly. The two variables can be seen as inconsistent and the results can be interpreted in various ways. First, it may be argued that the respondents could have been contradicting in their beliefs to comply with the questionnaire, meaning that they rather agree than disagree. Second, the results can also be understood as an indication that VCC is considered to be an environmentally friendly automobile manufacturer.
6 Conclusions

Our research indicates a low explanation value of the proposed model and the factors environmental knowledge and responsibility feelings did not have any significant affect on intentions to purchase environmentally friendly automobiles. The reason for this, as discussed in the analysis section can be the difficulties of measuring knowledge on a scale and the lack of awareness of moral norms. Since the model was developed during the 1990’s further contribute to the fact that it needs readjustment in order to suit the new generation of students. However, strong evidence can be found in our research that environmental values significantly affect purchase intention of environmentally friendly automobiles among young Chinese consumers. Values are something that is deeply rooted within every individual and they account as an imperative underlying factor in all decisions we make as consumers. Therefore, we can conclude that environmental values to a great extent affect intentions, whereas it appears relatively more unlikely that environmental knowledge and responsibility feelings have a significant effect on purchase intentions.

When interpreting the results, it becomes clear that there is a distinct demand for environmentally friendly automobiles amongst the young Chinese consumers. The respondents were positive toward environmentally friendly automobiles and a majority intended to purchase such a car. There is a trend toward increased awareness of environmental concern and consumers are more aware of how their behavior affects the environment. When weighing the evidence, this global trend seems to be apparent also among young Chinese consumers. We believe that there will be an increase in demand for environmentally friendly automobiles and VCC should take on this opportunity. The practical implications for VCC will be treated further in the practical implications section where we will give recommendations on how the company can take advantage of this opportunity.

6.1 Criticism against our research

During the process of our thesis we have encountered many problems and challenges that have been overcome in the best possible way. When evaluating the thesis there are some criticisms that can be made. The most important criticism will be discussed to aid further research within the subject.

Our research was conducted on a rather small sample size, making it difficult to generalize on the whole population. A larger sample size would have strengthened the generalisability of our research and thereby increased the usefulness.

Socially desirable responding is usually an evident problem when conducting research on a subject treating opinions that are socially sensitive, causing the respondents to answer in a manner that complies to the surrounding environment. It may be political in-
correct to not care about the environment. Since our research is concerned about the environment and we have not been able to control when, where and how the respondents have taken the questionnaire, we cannot ensure that the respondents have not been influenced by their surrounding. This can be seen as a weakness of our research, but this is of course the case for all web-based questionnaires.

Purchase intentions can often predict a behavior, but this is not always a certainty. Usually there exist a gap between intentions and behavior, which is especially evident when measuring environmental intentions. Individuals tend to express positively toward environmentally friendly products but those intentions may differ when it comes to the actual behavior implicating there is a gap between intention and behavior. This means that we cannot be certain that there exist a demand for environmentally friendly products. We have provided a prediction of our research questions which may differ from the reality.

### 6.2 Future Research

In our research we have had the primary focus on investigating the relationship between the factors environmental knowledge, environmental values, and responsibility feelings with intentions. This means that we have prioritized a few factors that we found to be suitable for the research at hand. That is why theoretical models focusing on other factors relating to intention such as Ajzen and Fishbeins (1980) would be very interesting to test in order to see how good that model fits the research task.

Furthermore, it would be very interesting to see a study focusing more thoroughly on the consumers’ attitude who do not intend to purchase environmentally friendly cars to see what reasons that may influence their decision. This would contribute valuable information why some consumers do not consider to purchase environmentally friendly cars.
7 Practical Implications for Volvo

From the work with our thesis we can conclude that there are several recommendations that should be recognized by VCC when conducting their business on the Chinese market. We will explain the most important points and challenges for VCC in order to facilitate their business development in regard to environmentally friendly automobiles.

From the research results in our thesis we believe that there is a demand for environmentally friendly automobiles amongst young Chinese consumers. Most importantly there are several indications that the Chinese respondents are positive towards purchasing environmentally friendly cars. From what we could interpret from the results there were strong indications that many of the respondents were willing to pay more for an environmentally friendly car compared to a regular car (See appendix). Furthermore, the most important attributes that VCC should retain when developing new environmentally friendly cars is the quality and comfort. The performance and design of the environmentally friendly automobiles were of less importance.

This implicates that VCC should continue their development of environmentally friendly cars and should of course make the automobiles as cost efficient as possible but not make any sacrifices on part of the quality and comfort of the automobiles. The results from our research could even motivate a larger investment in the area of environmentally friendly cars. However, it all comes down to what the customers are willing to pay for the features supplied by VCC. This makes it extremely important to know what the customers want and how they want it. VCC should therefore conduct further research on that area to understand more thoroughly what is expected from an environmentally friendly automobile. Our research has provided an insight in what VCC should aim for but more research is needed to validate our findings.

Based on the positive attitude towards environmentally friendly cars we believe that VCC could make use of their current prominent brand position to penetrate the Chinese market concerning environmentally friendly cars. We believe that a successful marketing and sales campaign could contribute to a first mover’s advantage that would benefit VCC in this market. It is important at an early stage to reach the early adapters who may serve as opinion leaders that can influence the surrounding environment. To reach those opinion leaders, VCC has to design market communications that appeal to this group of people. As our results indicate quality and comfortability are considered to be of great importance when purchasing an environmentally friendly automobile. VCC should aim at designing a message that is consistent with the features in form of quality and comfortability which we know that the Chinese customers appreciate. At the moment when new products are introduced as with environmentally friendly automobiles the knowledge of this product may be limited causing misinterpretations of what the product can offer. Skepticism often prohibits the consumers to acquire the correct information or knowledge. VCC should therefore put an effort on creating a clear message
communicating that an environmentally friendly automobile can without a doubt offer the same quality and comfortability as a regular automobile. In addition, the already initiated DRIVe program should be further developed introducing new hybrid cars forcing the organizational vision to move forward.

The marketing campaign should be focused on appealing to the Chinese consumers values since that is a significant factor correlated to the respondents purchasing intentions. With this information at hand further research is needed to understand what kind of environmental values Chinese students have because they will become the future purchasing power. This facilitates VCC to strategically position themselves in the mind of the consumers as the number one choice in the environmentally friendly automobile sector. According to our research we found that VCC came in 2nd place in terms of environmentally friendliness. The only brand that received a better result was Toyota which we believe is associated to their successful marketing campaign with their car model Prius. If VCC can capitalize on the already created awareness and further advance in this field they may very well establish themselves in a very prominent position. When Chinese consumers think about environmentally friendly automobiles they should think about VCC and acquire top of mind awareness.

VCC has for a long time been associated with safety which has earned them a best in class position on the global market. This is reinforced by the results from our questionnaire where the attribute safety received the highest ranking among the listed attributes (see table 4.4). This result also indicates that the Chinese respondents are not only familiar with VCC but also have a great awareness of the company’s prime attributes. If VCC can capitalize on their already strong brand and utilize the key attributes in their launch of environmentally friendly automobiles on the Chinese market, this will create added value for the customers. Added value will not only acquire new customers but also retain the customers already loyal to the brand. By combining quality, safety and environmentally friendliness VCC will manage to attain a distinct place in the minds of their consumers. However, it is important to keep their old customer base by using the original design language. VCC is famous for their Scandinavian stylistically pure design that is the overarching style that is associated with VCC and should therefore make the most of it.

By staying true to the rich heritage while adding a new path on the road to the masses, VCC can prosper and continue on their successful journey in becoming the market leader of environmentally friendly automobiles in China. We strongly believe VCC has the potential and the strategic capabilities to take on the competition and seize the opportunity that is ahead of them.
8 References:

Printed Sources:


Ajzen I and Fishbein, M (1975), A Bayesian analysis of attribution processes, psychological bulletin, 82, 261-277

Ajzen I and Fishbein, M (1977) Attitude-behavior relations: A theoretical analysis and review of empirical research, Psychological bulletin, 84, 888-918


Daniel Katz, The functional approach to the study of attitudes.


**Electronic Sources:**


9 Appendix

9.1 Appendix A Questionnaire

Full questionnaire which was sent out to all respondents. Responsibility feelings, environmental values, environmental knowledge and intentions used a 5-point Likert scale where respondents indicate to what extent they agree or disagree with each statement. The attitude questions are followed by ordinal scales where the respondents rank VCC together with four competitors in terms of environmental friendliness. There is also a ranking scale where respondents rate the attributes that are most associated with VCC. In the end we put some general background questions to get general information about our respondents.

Responsibility Feelings

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th></th>
<th></th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I consider myself at least partly responsible for contributing to the greenhouse effect.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>In my point of view CO₂ emissions is not something I feel responsible for.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I feel personal responsibility for polluting the air.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>Driving an environmentally friendly automobile would make me feel less guilty of driving</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>I feel personal responsibility to leave the earth in good shape for future generations.</td>
<td>□</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
## Environmental Values

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th></th>
<th></th>
<th></th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel upset when companies emit large quantities of CO₂.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Future generations should have access to a healthy environment when they grow up.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The environment is worth preserving.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental issues are greatly exaggerated.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I feel upset when companies or governments exploit the planet’s natural resources for short-term profits.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I do not care for the environment.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Knowledge</td>
<td>Strongly disagree</td>
<td>Strongly agree</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
<td>----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automobiles</strong> are a contributing factor of CO₂ emissions</td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Electrical and hybrid automobiles are in general more environmentally friendly</strong></td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automobiles are not a contributing factor to the greenhouse effect</strong></td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Driving a fuel efficient car reduces CO₂ emissions</strong></td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automobiles can contribute to smog in large cities</strong></td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Aggressive driving leads to increased CO₂ emissions</strong></td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>In general diesel engines consume more fuel than regular engines</strong></td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Automobiles contribute to air pollution</strong></td>
<td>☐</td>
<td>☐</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentions</td>
<td>Strongly disagree</td>
<td></td>
<td>Strongly agree</td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>--------------------</td>
<td>------------------</td>
<td>----------------</td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if the cost is equivalent to a regular car</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if the cost is higher than a regular car</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if the quality is lower than a regular car</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if the performance is lower than a regular car</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if it has a less appealing design</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I would buy an environmentally friendly car even if it is less comfortable</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Q13 Which car manufacturer do you consider to be most environmentally friendly. Begin by selecting the the most environmentally friendly car manufacturer and assign it as 1 (highest up) and the next most environmentally friendly car manufacturer as 2 (second highest up). Continue this procedure until you have ranked all the alternatives.

_____ Volvo
_____ BMW
_____ Toyota
_____ Audi
_____ Mercedes

Are you familiar with the brand Volvo Cars?
☐ Yes
☐ No

Do you consider Volvo Car Corporation to be an environmentally friendly brand?
☐ Yes
☐ No

What characteristics do you associate to Volvo? Begin by picking the characteristic that you associate strongest to Volvo and assign it as 1 and the second strongest association as 2. Continue this procedure until you have ranked all the alternatives.

_____ Quality
_____ Safety
_____ Design
_____ Performance
_____ Environmental friendliness

Age
☐ 18 and younger
☐ 19-24
☐ 25 and older

Gender
☐ Male
☐ Female
9.2 Appendix B VCC environmental friendliness

Do you consider Volvo Car Corporation to be an environmentally friendly brand?

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Valid Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Yes</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>59</td>
</tr>
</tbody>
</table>
9.3 Appendix C Scree plot

A scree plot graphically shows eigenvalues of each sorted factors, starting with the largest and ending with the smallest.

Responsibility feelings

![Scree Plot for Responsibility feelings](image)

Environmental Values

![Scree Plot for Environmental Values](image)
Environmental Knowledge

Scree Plot

Intentions

Scree Plot
9.4 Appendix D Multivariate regression analysis

A full description of the multivariate regression analysis. The method we used was a stepwise function. The significance level of all factor scores can be viewed in the table.

### Variables Entered/Removed

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered</th>
<th>Variables Removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Environmental values Factor 1</td>
<td></td>
<td>Stepwise (Criteria: Probability-of-F-to-enter &lt;= .050, Probability-of-F-to-remove &gt;= .100).</td>
</tr>
</tbody>
</table>

a. Dependent Variable: REGR factor score 1 for analysis 4

### Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>R Square Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.313*</td>
<td>.098</td>
<td>.081</td>
<td>.95466139</td>
<td>.098</td>
<td>5.071</td>
<td>1</td>
<td>54</td>
<td>.019</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Environmental values Factor 1

### ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>5,351</td>
<td>1</td>
<td>5,351</td>
<td>5.871</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>49,214</td>
<td>54</td>
<td>.911</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>54,565</td>
<td>55</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), REGR factor score 1 for analysis 2

b. Dependent Variable: REGR factor score 1 for analysis 4

### Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.049</td>
<td>.128</td>
</tr>
<tr>
<td></td>
<td>Environmental values Factor 1</td>
<td>.304</td>
<td>.125</td>
</tr>
</tbody>
</table>

a. Dependent Variable: REGR factor score 1 for analysis 4
### Excluded Variables

<table>
<thead>
<tr>
<th>Model</th>
<th>Beta In</th>
<th>t</th>
<th>Sig</th>
<th>Partial Correlation</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>1</td>
<td>Environmental values Factor 2</td>
<td>.014*</td>
<td>.105</td>
<td>.917</td>
<td>.014</td>
</tr>
<tr>
<td></td>
<td>Environmental knowledge Factor 1</td>
<td>-.079*</td>
<td>.434</td>
<td>.666</td>
<td>.060</td>
</tr>
<tr>
<td></td>
<td>Environmental knowledge Factor 2</td>
<td>-.046*</td>
<td>.349</td>
<td>.728</td>
<td>.048</td>
</tr>
<tr>
<td></td>
<td>Environmental responsibility feelings Factor 1</td>
<td>.037*</td>
<td>.261</td>
<td>.795</td>
<td>.036</td>
</tr>
<tr>
<td></td>
<td>Environmental responsibility feelings Factor 2</td>
<td>.030*</td>
<td>.219</td>
<td>.827</td>
<td>.030</td>
</tr>
</tbody>
</table>

*Predictors in the Model: (Constant), Environmental values Factor 1
Dependent Variable: REGR factor score 1 for analysis 4
9.5 **Appendix E Separate regression analysis**

In this appendix the results are presented from the separate regressions using Environmental values factor 2 as independent variable and design and quality as dependent variable:

<table>
<thead>
<tr>
<th>Coefficients*</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>3.704</td>
<td>.147</td>
<td>25.274</td>
<td>.000</td>
<td>3.410 to 3.997</td>
</tr>
<tr>
<td>Environmental values Factor 2</td>
<td>-2.73</td>
<td>.147</td>
<td>-1.854</td>
<td>.069</td>
<td>-5.69 to .022</td>
</tr>
</tbody>
</table>

*a. Dependent Variable: I would buy an environmentally friendly car even if it has a less appealing design*

<table>
<thead>
<tr>
<th>Coefficients*</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>2.728</td>
<td>.139</td>
<td>19.598</td>
<td>.000</td>
<td>2.449 to 3.006</td>
</tr>
<tr>
<td>Environmental values Factor 2</td>
<td>.286</td>
<td>.140</td>
<td>.263</td>
<td>.046</td>
<td>.005 to .566</td>
</tr>
</tbody>
</table>

*a. Dependent Variable: I would buy an environmentally friendly car even if the quality is lower than a regular car*

<table>
<thead>
<tr>
<th>Coefficients*</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>2.745</td>
<td>.149</td>
<td>18.447</td>
<td>.000</td>
<td>2.446 to 3.044</td>
</tr>
<tr>
<td>Responsibility feelings 1</td>
<td>.079</td>
<td>.189</td>
<td>.073</td>
<td>.416</td>
<td>-.301 to .459</td>
</tr>
<tr>
<td>Responsibility feelings 2</td>
<td>.047</td>
<td>.165</td>
<td>.043</td>
<td>.287</td>
<td>-.284 to .379</td>
</tr>
<tr>
<td>Environmental values 1</td>
<td>-0.23</td>
<td>.211</td>
<td>-.021</td>
<td>-.107</td>
<td>-.447 to .402</td>
</tr>
<tr>
<td>Environmental values 2</td>
<td>.273</td>
<td>.160</td>
<td>.240</td>
<td>1.704</td>
<td>-.049 to .596</td>
</tr>
<tr>
<td>Environmental knowledge 1</td>
<td>.110</td>
<td>.234</td>
<td>.101</td>
<td>.471</td>
<td>-.361 to .581</td>
</tr>
<tr>
<td>Environmental knowledge 2</td>
<td>-0.092</td>
<td>.163</td>
<td>-.083</td>
<td>-.560</td>
<td>-.420 to .237</td>
</tr>
</tbody>
</table>

*a. Dependent Variable: I would buy an environmentally friendly car even if the quality is lower than a regular car*

<table>
<thead>
<tr>
<th>Coefficients*</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>3.768</td>
<td>.149</td>
<td>25.250</td>
<td>.000</td>
<td>3.468 to 4.068</td>
</tr>
<tr>
<td>Responsibility feelings 1</td>
<td>.242</td>
<td>.190</td>
<td>.218</td>
<td>1.278</td>
<td>.207 to .623</td>
</tr>
<tr>
<td>Responsibility feelings 2</td>
<td>.043</td>
<td>.165</td>
<td>.038</td>
<td>.259</td>
<td>-.290 to .375</td>
</tr>
<tr>
<td>Environmental values 1</td>
<td>.153</td>
<td>.212</td>
<td>.138</td>
<td>.720</td>
<td>-.273 to .578</td>
</tr>
<tr>
<td>Environmental values 2</td>
<td>-.371</td>
<td>.161</td>
<td>-.316</td>
<td>-2.305</td>
<td>-.694 to -.048</td>
</tr>
<tr>
<td>Environmental knowledge 1</td>
<td>-.088</td>
<td>.235</td>
<td>-.078</td>
<td>-.374</td>
<td>-.560 to .384</td>
</tr>
<tr>
<td>Environmental knowledge 2</td>
<td>-.058</td>
<td>.164</td>
<td>-.051</td>
<td>-.352</td>
<td>-.387 to .272</td>
</tr>
</tbody>
</table>

*a. Dependent Variable: I would buy an environmentally friendly car even if it has a less appealing design*
9.6 Appendix F Additional multivariate regression analysis

In this appendix the results is presented from the regression using Environmental values factor 1 and gender as independent variables and intentions as dependent variable.

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.871</td>
<td>.400</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>- .569</td>
<td>.248</td>
<td>-.284</td>
<td>-.293</td>
</tr>
<tr>
<td>Environmental values Factor 1</td>
<td>.267</td>
<td>.123</td>
<td>.268</td>
<td>2.164</td>
</tr>
</tbody>
</table>

* a. Dependent Variable: Intentions factor