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'Explaining environmentally conscious consumer behaviour: an international approach.'

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Abstract

This thesis studies the driving factors that affect the environmentally conscious behaviour of an individual. Where previous research focused on a specific set of variables or country, this study incorporates many variables that could potentially affect environmentally conscious consumer behaviour, and tests this framework for 28 countries using a multi level approach. The results show evidence for several factors affecting ECCB, of which some are consistent for all countries considered. The final framework provides a good starting point for further cross-country studies regarding environmentalism in general.

Contents

1 Introduction

Climate change is destined to be the global challenge the world is facing for the coming decades. Global average temperatures continue to rise every year (NASA [2020]), and so do the global CO_2 emissions (Friedlingstein et al. [2019]). The scientific consensus is that the change in climate is caused by human activities, and the Intergovernmental Panel on Climate Change (IPCC) reported in 2014 that substantial and sustained reductions in greenhouse gas emissions is needed, which together with adaptation can limit climate change risks. The majority of the countries acknowledge the urgency of the problem, and initially 196 countries have signed The Paris Agreement in 2015 with the goal of limiting global warming. However, there exists a loud voice of disagreement regarding this matter, and former United States president Trump even withdrew the US from the Paris Agreement (now rejoined by president Biden) claiming it is a hoax.

This division of opinion is also prevalent among consumers. Results from a poll conducted by GALLUP [2019] shows that around 66% of Americans believe climate change is caused by human activities, and is remaining stable. Furthermore, a minority of 45% think that climate change is a serious threat in their lifetime. Gallup also conducted this poll in other countries where the climate change awareness is even less. Where as in the U.S. 97% have heard of climate change, less than a quarter of the people in developing countries heard from it. Furthermore, adults in Asia, except those from developing countries, are the least likely to have heard from climate change. It seems that there are many consumers who value pro-environmental behaviour, but there are also numerous consumers who do not care about the environment. This worldwide difference in consumer behaviour and opinion poses a challenge to policymakers who need to motivate the population to move to a more sustainable way of living. Most of the countries agree that the problem is urgent, but a large part of the population does not want to change, or does not know about climate change at all.

The question that arises is here is what motivates someone to have a more sustainable lifestyle. Hundreds of studies have been conducted that try to explain the motivation of environmentally conscious consumer behaviour. For example, Grunert and Juhl [1995] attempted to apply the Schwartz [1992] value theory and measurement approach to explain consumer behaviour regarding the purchase of organic foods. They found that this purchase behaviour could be linked to certain values and that the Schwartz Value Theory (SVT) is a promising tool for cross-cultural research regarding consumer behaviour. This research however was limited to a dataset containing only teachers in Denmark. Fraj and Martinez [2007] also found evidence that ecological consumer behaviour can be linked to the environmental attitudes of that per-

son. This study however only used survey data with Spanish respondents, and they also did not incorporate the value framework of Schwartz in their research. A study by Straughan and Roberts [1999] also attempted to profile students based on environmentally conscious consumer behaviour. They found that demographic factors are not as good of a profiling method as psychographic criteria.

Previous work mainly focused on specific countries or a specific set of variables, or had a relatively small sample size. Therefore, the goal of this study is to create a data driven framework of general values and consumer values, as well as sociodemographic and cultural variables that positively or negatively impact environmentally conscious consumer behaviour (ECCB). This framework will be tested on an international scale using a dataset with a sample size of over 13,000 observations. The results that come forth from this research could help policymakers by giving an insight on what factors and values drive a consumer to be more or less conscious about the environment, and how these factors differ among countries and cultures. These insights could then be used to stimulate people to be more environmentally responsible by nudging people based on certain characteristics.

The remainder of this thesis is structured as follows: Section 2 provides the theoretical framework of this topic based on previous literature, and concludes with the hypotheses to be tested. Section 3 will describe the dataset and the preparations of the data, and will also explain the methodology of this research. Section 4 and 5 will give an overview of the results, and reflect back on the hypotheses and the main research question in the conclusion. Lastly, this paper concludes by giving a discussion on the results and providing recommendations for further research.

2 Theoretical Framework

The following section discusses the current framework of academic literature upon which this research paper is based. First, the concept of environmentally conscious consumer behaviour is defined and its context in previous studies, after which the factors that can affect ECCB will be elaborated. The Schwartz value framework will be discussed in section 2.2, and other consumer constructs that will be considered are explained in section 2.3. The socio-demographics and their relationship with ECCB will be elaborated in section 2.4, and lastly the framework will conclude with a review on cross-cultural differences of ECCB and concepts to describe these differences. The corresponding hypotheses can be found under each subsection.

2.1 Environmentally conscious consumer behaviour

The concern about the environment and the interest in studying ECCB started around the 1960s. In contrary to the common belief of limitless resources, continuous economic growth, and faith in the problem solving abilities of science and technology know as the Dominant Social Paradigm (Albrecht et al. [1982]), the public opinion has shifted to more environmental concern and the recognition of the influences from humanity on the environment, known as the New Environmental Paradigm (Dunlap and Van Liere [1978], Roberts and Bacon [1997], Dunlap et al. [2000]). Due to this increased environmental concern, the behaviour of consumers also changed. ECCB can be defined as consumer behaviour with the intention of changing the environment in a beneficial way. Important to note is that the intention does not have to mean that there is an actual environmental impact (Stern [2000]). An example of this is the purchase of an electric car because of reduced carbon emissions compared to a normal car, whilst this is not necessarily the case due to charging the car with coal-based energy. Nevertheless, in most cases the environmental intent and impact are consistent, and therefore the study of ECCB is an important step in shaping a better world.

Early research concerning ECCB done by Hines et al. [1987] found a moderate positive relationship between environmental attitudes and behaviour. Kollmuss and Agyeman [2002] elaborated on this relationship and found that it is not necessarily the environmental knowledge that drives the behaviour, but rather a combination of knowledge, emotion, personality traits and external factors. In order to analyse the relationship between the internal factors and the ECCB, this research will measure the internal factors using the Schwartz [1992] basic value theory explained in section 2.2, and additionally some other consumer constructs and demographic variables that will be elaborated in section 2.3. The external factors that affect ECCB include

economic situation, infrastructure, culture and others. Therefore, nationality of the consumer will be included along with country-specific variables such as GDP per capita and cultural dimensions from Hofstede [2010]. The country of living holds much information about the environment of the consumer, and including it as a variable can capture the external factors that drive ECCB. This theoretical relationship between the country of living and ECCB will be elaborated in section 2.4. An overview of this framework can be seen in figure 2.1.

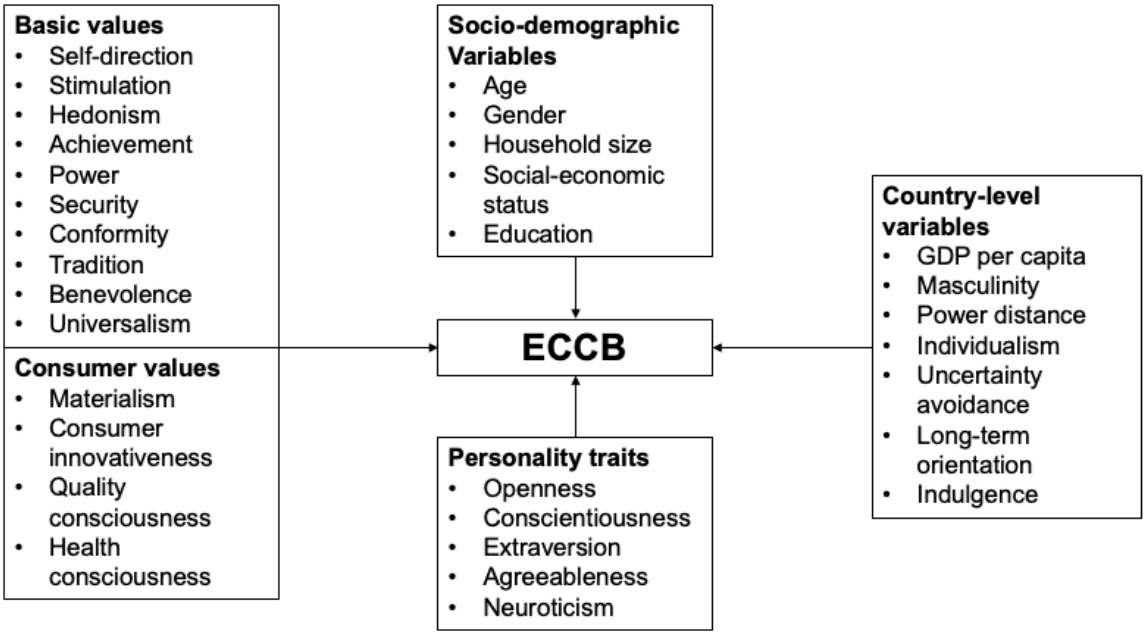

Figure 2.1: Framework of ECCB and its explanatory variables.

2.2 Schwartz theory of basic values

The most important study regarding the topic of basic values is the framework provided by Shalom H. Schwartz. Schwartz and Bilsky [1987] created the foundation by defining the universal types of values based on the three requirements: biological needs, interactional requirements for interpersonal coordination, and societal demands for group welfare and survival. The initial thoughts about values have been polished in the study by Schwartz [1992], and a clear overview is given in Schwartz [2012] which will be used to summarize the theory of basic values.

Basic values can be described as things that are important to people in life. Schwartz [1992] describes these values using six main characteristics: Values are beliefs and connected to emotions, refer to desirable goals, transcend specific actions and situations, serve as standards or criteria, are ordered by importance, and the relative importance of multiple values guides action. These six characteristics are features of all values. Based on these features and the three universal requirements for welfare and survival, the value theory poses ten different values that

an individual can pursue, which are listed in table 2.1.

Table 2.1: *Overview of the ten values from the value theory (Schwartz [2012]).*

Value	Description
Self-Direction	Independent thought and actions.
Stimulation	Excitement, novelty, and challenge in life.
Hedonism	Pleasure or sensuous gratification for oneself.
Achievement	Personal success through demonstrating competence according to social standards.
Power	Social status and prestige, control or dominance over people and resources.
Security	Safety, harmony, and stability of society, of relationships, and of self.
Conformity	Restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.
Tradition	Respect, commitment, and acceptance of the customs and ideas that one's culture or religion provides.
Benevolence	Preserving and enhancing the welfare of those with whom one is in frequent personal contact.
Universalism	Understanding, appreciation, tolerance, and protection for the welfare of all people and for nature.

The most important aspect of the value theory is not the values itself, but the underlying relationship between them. Some values are related and contribute to a similar goal, such as both *power* and *achievement* that can be pursued together. However, pursuing these values will likely obstruct opposing values such as *benevolence* and *universalism*. This relationship between values can be represented in a circular structure shown in figure 2.2. This circular structure of values can be easily interpreted to see which values oppose each other and which values are congruent. Values that are adjacent to one another contribute to a similar goal and are likely to conflict with values on the other side of the circle. Specifically, *conformity* and *tradition* are the most similar and occur in the same wedge, however *tradition* is more conflicting with opposing values for it being on the edge of the circle. The concepts outside of the circle represents the general dimensions of the values, which also oppose those dimensions on the other side of the circle. Someone who is *open to change* is likely to care less about *conservation*. Interesting to note is that *hedonism* contributes to both *openness to change* and *self-enhancement*, and is therefore placed on the border of both dimensions.

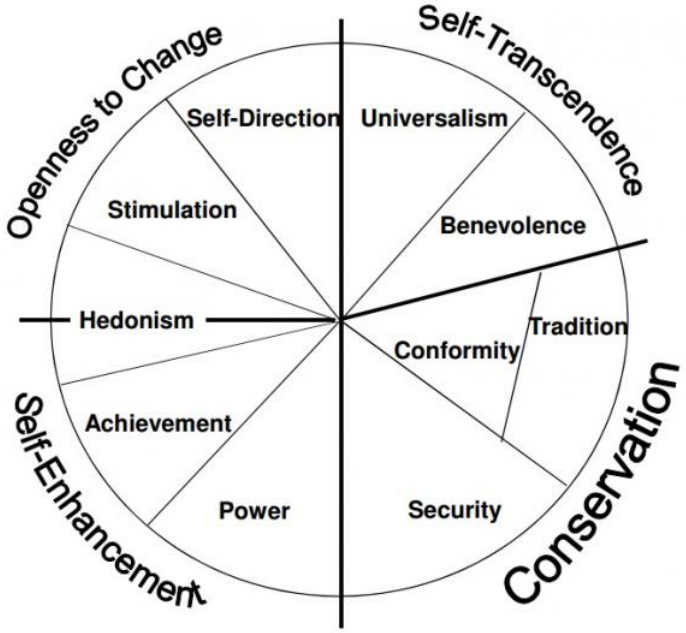

Figure 2.2: *Circular representation of the ten types of values.*

This circular structure of values has been tested by multiple studies such as those by Bilsky et al. [2011] and Davidov et al. [2008] using samples from many countries with a diverse range of cultures, languages, religions, ages, etc. These studies find that the opposing four dimensions are present in all samples, and that the proposed structure of the ten basic values are observed in 90% of the samples. Empirical evidence shows that the Schwartz Value Theory captures the structure of motivational values behind human thought and behaviour on a global scale.

The SVT proves to be a useful tool to quantify the basic values that drive behaviour, and it is therefore a logical approach to use these values as an explanatory variable for ECCB. There have been quite some studies regarding this relationship which found several conclusions. Grunert and Juhl [1995] studied the relationship between values and the buying of organic foods of Danish school teachers. Results showed people with 'green' attitudes typically pursue the values *universalism*, *benevolence* and *self-direction*, which relate heavily to the *self-transcendence* domain and part of the *openness-to-change* domain. Adversely, people without 'green' attitudes typically pursue the values *security*, *conformity*, *tradition* and *power*, which relate heavily to the *conservation* domain and part of the *self-enhancement* domain. *Hedonism*, *achievement* and *stimulation* proved to be irrelevant for their study. In a similar study using a broader sample, Schultz et al. [2005] also found that environmental concerns correlate positive to values in the *self-transcendence* domain, and negatively to values in the *self-enhancement* domain. Furthermore, their results showed to be robust across different cultures. Pepper et al. [2009]

studied the relationship between values and socially conscious consumer behaviour and found a similar positive relationship in the *self-transcendence* domain, and a negative relationship in the *self-enhancement* domain.

Previous research find a comparable relationship between the Schwartz basic values and environmental or social attitudes. Using these findings, a hypothetical relationship between the values and ECCB can be formed, expressed as a curve shown in figure 2.3. This curve shows that values within the same higher order domain are expected to have a similar relationship with ECCB. For example, *security*, *conformity* and *tradition* are all expected to have a negative relationship with ECCB, and are all in the conservation domain. Therefore, this study will group the values into these 4 higher order domains and thus reduce the dimensions in the analysis.

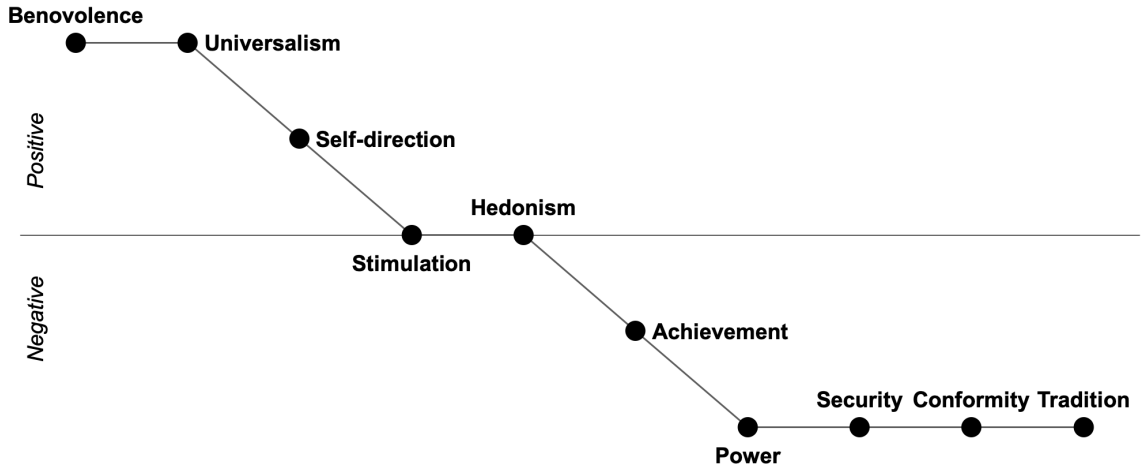

Figure 2.3: *Hypothetical curve of the relationship between values and ECCB.*

Based on the expectations shown in figure 2.3, the following hypotheses are set up regarding the relationship between the Schwartz value domains and ECCB:

- $H_{1.1}$: 'The value domains *openness to change* and *self-transcendence* positively affect ECCB.'
- $H_{1.2}$: 'The value domains *conservation* and *self-enhancement* negatively affect ECCB.'

2.3 Consumer constructs and personality traits

2.3.1 the 'Big five'

Besides the SVT, there are other constructs that can measure personality. One of these theories is the 'big five' (Digman [1990], John et al. [1999]), which as been proven to be applicable

on a global scale by McCrae and Costa Jr [1997]. This theory states that a personality can be structured with five concepts which are *openness*, *conscientiousness*, *extraversion*, *agreeableness*, and *neuroticism*. *Openness* relates to appreciating to new experiences and abstract thinking. *Conscientiousness* relates to self-awareness and a desire for achievement. *Extraversion* relates to social behaviour and engagement with surroundings. *Agreeableness* relates to harmony with others and *neuroticism* relates to negative emotions and depressive thoughts.

Many previous researches have studied the relationship between the 'big five' and ecological attitudes or behaviour. Milfont and Sibley [2012] studied the relationship between the 'big five' and environmental engagement, and found that *agreeableness*, *conscientiousness* and *openness* are the main predictors, while *extraversion* and *neuroticism* do not seem to be associated with environmental engagement. Kvasova [2015] studied eco-friendly behaviour by tourists and found that this behaviour is related to *agreeableness*, *conscientiousness*, *extraversion* and *neuroticism*, but not *openness*. A study done by Brick and Lewis [2016] found that emission reducing behaviour could be best predicted by traits such as *openness*, *conscientiousness*, and *extraversion*. A recent study by Soutter and Mõttus [2021] concluded that pro-environmental attitudes and behaviour are most related to *openness*, *agreeableness* and *consciousness*. *extraversion* was not consistently related, and *neuroticism* was not related at all.

To summarize, only *consciousness* appears to be consistently related with pro-environmental attitudes and behaviour, while the other four differ among the various papers. Still, *agreeableness* and *openness* have a relationship to pro-environmental attitudes in most of the studies, while *extraversion* and *neuroticism* seem to be the most inconsistent. Therefore, it is expected that *agreeableness*, *conscientiousness* and *openness* are positively related to ECCB, which is formally defined in the following hypothesis:

- $H_{2.1}$: 'The personality traits *agreeableness*, *conscientiousness* and *openness* positively affect ECCB.'

2.3.2 Materialism

Additionally to the 'big five', other consumer constructs will be considered concerning their relationship with ECCB. One of which is materialism, which refers to a belief about the importance of physical products a person owns (Richins and Dawson [1992]). According to previous studies, materialism can have a significant impact on pro-environmental attitudes and behaviour. A study done by Banerjee and McKeage [1994] showed that environmentalism and materialism are negatively correlated, and can be considered as competing orientations. This conclusion is shared by Kilbourne and Pickett [2008], and therefore it can be expected that materialism is

negatively correlated to ECCB in this study, which is formulated in the following hypothesis:

- $H_{2.2}$: 'The consumer construct *materialism* negatively affects ECCB.'

2.3.3 Consumer innovativeness

Another personality trait that could affect ECCB is consumer innovativeness, which measures how likely consumers are to try a new product. According to Lao [2014], consumer innovativeness has a positive effect on green attitudes, which develop into green purchasing behaviour. Englis and Phillips [2013] state in their paper that consumer innovativeness mediates the link between environmentally conscious attitudes and behaviors, which implies that the attitudes are more likely to turn into behaviour. Therefore, this variable will also included in this thesis as it is likely that is has a positive relationship with ECCB, which is formulated in the following hypothesis:

- $H_{2.3}$: 'The consumer construct *consumer innovativeness* positively affects ECCB.'

2.3.4 Quality consciousness

Next, the personality trait of quality consciousness will be considered, which measures how important the quality of a product is to a consumer. According to Lin and Chang [2012], people tend to perceive green products as lesser quality, and in turn tend to use more of the product to make up for it, or not buy the product at all. This could imply that quality conscious consumers are less likely to buy green products, and therefore this variable will also be included to test if there is a negative relationship with ECCB, formulated in the following hypothesis:

- $H_{2.4}$: 'The consumer construct *quality consciousness* negatively affects ECCB.'

2.3.5 Health consciousness

Another personality trait that could affect ECCB is health consciousness, which measures how much people value their own health. A study done by Chen [2009] found that health and environment conscious people are more likely to buy organic foods, with health consciousness being the most important. Organic foods can be considered as an environmentally conscious choice due to reduced use of chemicals for example, which could imply that health consciousness could be an explanatory variable for ECCB, which will be tested using the following hypothesis:

- $H_{2.5}$: 'The consumer construct *health consciousness* positively affects ECCB.'

2.4 Socio-demographic variables

Although the basic values and consumer constructs are shown to have significant explanatory power on environmental attitudes and behaviour, the early studies on ECCB focused mainly on socio-demographics and their relationship with ECCB. Note that most of these previous studies have sampling issues such as most of them only using only US data, or narrow sample groups that are not representative for the population. Nonetheless, these studies provide an insight on what can be expected regarding the relationship between socio-demographics and ECCB. Diamantopoulos et al. [2003] investigated these previous studies and addressed the relevance of demographic variables for environmental research today. Although their hypotheses are supported by lots of previous research, they find that the results are rather inconsistent. They conclude that it is difficult to profile green consumers on demographics alone, which implies that psychographic variables hold more explanatory power. Still, demographics are useful to include as control variables because some previous studies do find significant results which will be elaborated in the following sections.

2.4.1 Gender

The first variable that will be examined is gender. Dunlap [1983] studied the differences of environmental concern between males and females. They found that females are more likely to express environmental concern than males, however males are more likely to engage in environmental behaviour. A similar result is found by Schahn and Holzer [1990] using a German sample. These studies state that this difference is caused by males being more knowledgeable about the environmental issues and therefore have less concern, however this statement is not supported by Davidson and Freudenburg [1996]. They found that females have both higher concern, and are more likely to engage in green behaviour. Based on these studies, the relationship expressed in the following hypothesis can be expected regarding gender and ECCB:

- $H_{3.1}$: 'Females are more likely to express ECCB'

2.4.2 Age

Regarding the next variable age, Diamantopoulos et al. [2003] studied 33 articles and found only two studies that support a significant relationship between environmental consciousness and age (Arcury et al. [1987], Grunert and Kristensen [1992]). Therefore, it is likely that there is no relationship between age and ECCB.

2.4.3 Household size

Three studies that examined the relationship between number of children and ECCB (Brooker [1976], Jackson [1983], Grunert [1993]) all found the same conclusion that a larger household size is related to increased ECCB. Moreover, Grunert states that this relationship could be caused by the fact that larger families are more likely to have children in school where environmental matters are discussed, which in turn is brought home by the children causing the parents to be more aware about the environment. Based on these findings, the positive relationship between household size and ECCB is expected stated in the following hypothesis:

- $H_{3.2}$: 'Household size is positively related to ECCB.'

2.4.4 Social-economic status

Many papers have studied the effect of social class on green purchasing behaviour, of which most reported a positive relationship (Diamantopoulos et al. [2003]). Specifically, a study by Buttel and Flinn [1978] reported that the higher classes are more involved with matters like politics and environmental issues than the working classes, and are therefore more likely to participate in green activities. Therefore, the following hypothesis will be tested regarding the relationship between social-economic status and ECCB:

- $H_{3.3}$: 'A higher social-economic status positively affects ECCB.'

2.4.5 Education

The last demographic that will be included is education. Diamantopoulos et al. [2003] also examined many studies that tested the relationship between education and ECCB. Almost all studies found a positive relationship between a higher education level and green purchasing behaviour. According to Maloney et al. [1975], this is likely due to the fact that ecology and the balance of organisms and nature can be a difficult concept to understand fully, and therefore better educated people are more likely to understand the complex dynamics of the issues and be more incentivised to act accordingly. Therefore, the following hypothesis will be tested regarding the relationship between education and ECCB:

- $H_{3.4}$: 'A higher education level positively affects ECCB.'

This aforementioned list of consumer constructs and demographics is not by any means complete in the sense that they capture all internal factors that could drive ECCB. Still, based on previous literature, the most important concepts are included and should therefore be a sufficient framework of the internal factors that could drive ECCB.

2.5 Cross-cultural differences

As stated by Kollmuss and Agyeman [2002], the external factors that could affect pro-environmental behaviour are elements such as infrastructure, politics, culture and others. All these factors are highly dependant on the country of living, and including the nationality of the consumer could represent the external factors for ECCB. Although through modernisation and globalisation the cross-country differences are getting smaller, Inglehart and Baker [2000] prove that some cultural traditions can endure through this shift. De Mooij and Hofstede [2002] show that these differences in culture also reflect on consumer behaviour, and imply that ECCB differs among cultures. These cross-cultural differences are represented in six dimensions by Hofstede [2011], which will be included in this research as variables in order to test what cultural characteristics of a country could drive ECCB. A summary of these dimensions can be seen in table 2.2. Furthermore, the GDP per capita of a country will also be included as a control variable.

Table 2.2: *Summary of the Hofstede cultural dimensions.*

Dimension	Description
Masculinity	The extent to how the emotional gender roles are distributed. Masculine cultures value assertiveness, competition, achievement and succes of higher importance.
Power distance	Describes to what extent the less powerful in society accept that power is distributed unequally. Cultures with a higher power distance value wealth, power, and privilege as important.
Individualism	Refers to how the close the bonds are among its people. Individualistic societies focus more on independence, personal achievement and pleasure.
Uncertainty avoidance	The extent to how the people react to uncertain or risky situations. People in cultures with high uncertainty avoidance feel anxious in risky situations and often seek stability and predictability.
Long-term orientations	Refers to how a culture values behaviour such as saving and persistence, but also describes how well a culture can adapt to changes in the environment.
Indulgence	Stands for a culture where people are more free to have fun and enjoy life.

When looking at past papers that studied the cross-cultural relationship between the Hofstede dimensions and ECCB or environmentalism in general, it is hard to find a significant relationship. Liobikienė et al. [2016] studied the cross-cultural differences in the EU regarding green purchasing behaviour, and included several explanatory variables including the Hofst-

ede dimensions. They found significant differences in green purchasing between the different countries, however these differences could not be directly explained by the cultural dimensions. They found that factors such as knowledge and confidence where more significant. They do state that the cultural dimensions could be related to factors that drive green purchasing, and could therefore indirectly affect this behaviour.

A study done by Park et al. [2007] examined the relationship between the Environmental Sustainability Index and four of the Hofstede dimensions. They found a significant negative relationship between the two dimensions *power distance* and *masculinity*, and the Environmental Sustainability Index of a country. Cho et al. [2013] studied the relationship between the individualism measures and perceived customer effectiveness (PCE). Their results show that PCE positively affects environmental engagement and behaviour, and that a collectivistic culture has a higher level of PCE. It can therefore be deducted that a collectivistic culture has a higher level of environmental engagement, which is in line with a paper by Sreen et al. [2018]. For the other Hofstede dimensions no significant results can be found in past papers, and therefore an expected result cannot be hypothesised. The expected relationships regarding the Hofstede dimensions is stated the following hypothesis:

- H_4: 'Individuals in countries with a high level of *masculinity*, *power distance* and *individualism* show less ECCB.'

3 Data and Methodology

The following section will first explain the collection of the data and its sources, after which the variables will be defined and tested on reliability. Next, the data will be visualised and explored, and lastly the methodology of this study will be laid out.

3.1 Data collection

The individual-level data used for this thesis is a confidential dataset previously used by Steenkamp and De Jong [2010]. It is collected by marketing research agencies GfK and TNS by spreading a survey containing 178 questions to a demographically diverse sample of 28 different countries. The countries considered are in alphabetical order: Argentina, Austria, Belgium, Brazil, China, Czech, Denmark, France, Germany, Hungary, Ireland, Italy, Japan, the Netherlands, Norway, Poland, Portugal, Romania, Russia, Slovakia, Spain, Sweden, Switzerland, Taiwan, Thailand, the UK, Ukraine and the USA. The survey was spread using both the internet as using regular

mail. The total amount of respondents turned out to be 13,312, which is therefore also the sample size of this study.

For the country-level data, the Hofstede dimensions are retrieved from *geerthofstede.com* (Hofstede [2015]), which includes all six dimensions for all countries considered. The data for the country GDP per capita is retrieved from the International Monetary Fund (IMF [2021]), and values are taken for the year 2007. This is chosen due to the fact that the other dataset is from before 2010, and by choosing 2007 as the measurement year the time periods are similar and the values are unaffected by the 2008 financial crisis.

3.2 Defining variables

First of all, the dependant variable of this thesis is ECCB. This variable will be measured using the following question in the survey: *'I would be willing to stop buying products from companies guilty of polluting the environment, even though it might be inconvenient for me.'*. The phrase *'polluting the environment'* captures not only pollution in terms of carbon emissions, but could also be interpreted as the pollution in terms of plastic waste in the ocean or using chemicals for agriculture. Furthermore, the inconvenience part could also be interpreted in multiple ways such as products being more expensive or having to travel further to a different store. Therefore, this question captures ECCB as a broad concept and is excellent for use as a dependant variable. The question is answered using a five-point Likert scale, which makes ECCB quantifiable.

The independent variables that represent the basic values, consumer constructs and demographics are also retrieved from the survey data. Each of the different concepts are measured using the method from the corresponding literature. The basic values being measured using the value survey stated by Schwartz [1992], and materialism being measured as stated in Richins and Dawson [1992]. Consumer innovativeness is measured using eighth questions as stated by Steenkamp and Gielens [2003], and the measurement approach of the other variables can be found in Steenkamp and De Jong [2010]. Each of the questions are measured using Likert scales, and some concepts are measured using multiple questions concerning that concept. In order to get a robust estimate of that variable, the mean score of the answers is calculated and stored as the variable. Because of this, it is important to question the reliability of these variables. If the answers of these independent questions are far apart, the mean score of these answers are not that informative anymore. Therefore, in order to test the reliability of the variables, the standardised Cronbach alpha (Cronbach [1951]) is calculated and presented in table 3.1. As a rule of thumb, an alpha value of 0.70 is considered as good, a value of 0.80 is better, and a value larger than 0.90 is too larger suggesting that some questions could be redundant. The table

shows that most variables fall above the 0.70 threshold, and the Schwartz value dimensions are notably the most reliable. This is also likely due to the fact that these constructs are measured with ten or more questions. Some variables such as *consumer innovativeness* have an alpha lower than 0.70, indicating that they are less reliable which should be taken into account when discussing the results. Nevertheless, there are not alpha values below 0.60, and therefore all variables are reliable enough to be included in the analysis.

Table 3.1: *Cronbach α estimates.*

Variable	**Cronbach α**	**Number of questions**
Openness	.671	6
Conscientiousness	.696	6
Extraversion	.705	6
Agreeableness	.643	6
Neuroticism	.751	6
Materialism	.696	6
Consumer innovativeness	.610	8
Quality consciousness	.655	2
Health consciousness	.798	3
Self enchancement	.808	10
Openness to change	.834	10
Self trancendence	.888	13
Conservation	.862	14

Regarding the country level data, the Hofstede dimensions are measured on a scale from 0 to 100, and the GDP per capita is reported in USD. Because not all variables are measured on the same scale, the numerical independent variables for both the individual level and country level data are scaled using min-max normalisation such that all variables are measured on a scale between 0 and 1, which will help interpret the magnitude of the measured effects.

3.3 Descriptive statistics

Before analysing the data using complex modeling, the data will be explored using a set of visualisations and simple analyses. This step will help understand the structure of the data, and could potentially yield some interesting initial insights. The first plot shown in figure 3.1 plots the mean *ECCB* and its standard deviation for every country. The plot shows that all mean

scores fall between 3 and 4, but have a large standard deviation for every country. Furthermore, these large standard deviations show a large overlap between the countries, and therefore this plot shows that the differences in ECCB are much bigger within-country than between the countries as a group.

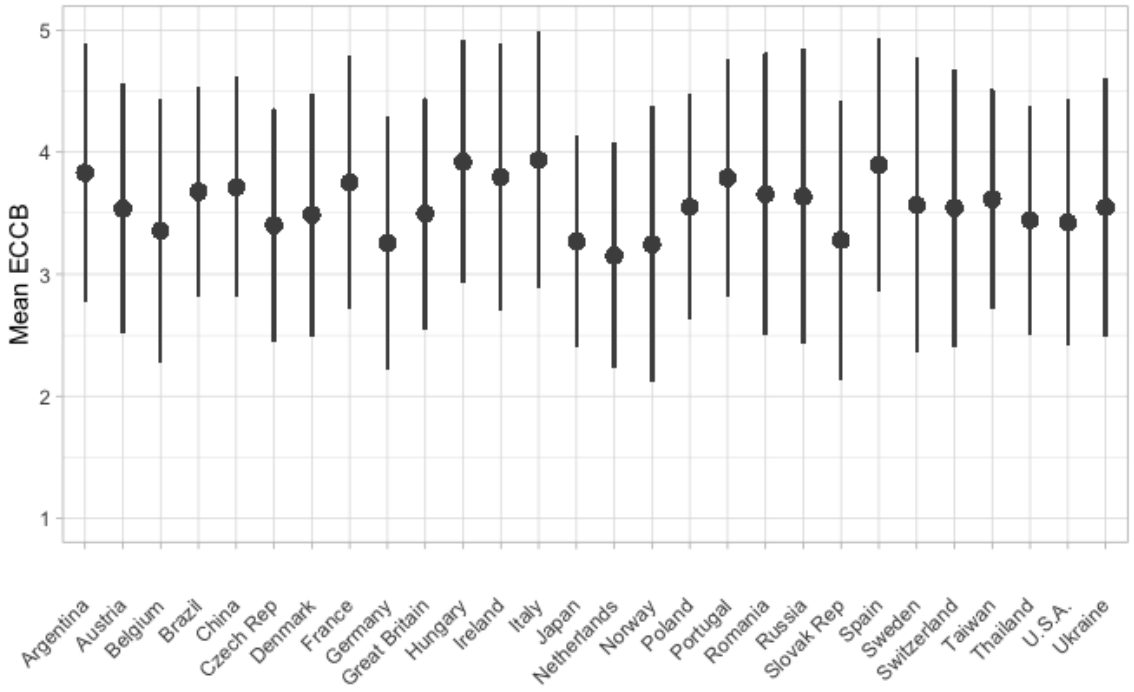

Figure 3.1: *Mean ECCB score per country.*

The next plot examines the male and female differences in *ECCB*, as shown in figure 3.2. The figure shows the relative frequencies of the five *ECCB* levels for both males and females. It can be observed that both groups have around 30% of the respondents rank *ECCB* at level three, however males respond more often with one or two than females. In contrary, females respond more often with four or five compared to males. Although the differences are small, the plot shows that females score higher on *ECCB* than males on average. However, the overall ranking of *ECCB* is similar for both groups, with level four occurring the most, and level one the least. Interesting to note is that the extremes are very different in proportion, with around 20% of people scoring a five, but only around 3% of people scoring a one. This shows that in general most people value ECCB, and only a very small percentage of people do not care about the environment. In order to test these differences between genders, a Welch two sample t-test is performed to check if the means are in fact significantly different from each other. The test shows that males have a mean ECCB of 3.49 and females have a mean score of 3.63, with a p-value smaller than 0.000. Therefore, the null hypothesis of equal means can be rejected and it can be said that females have a higher mean ECCB than males.

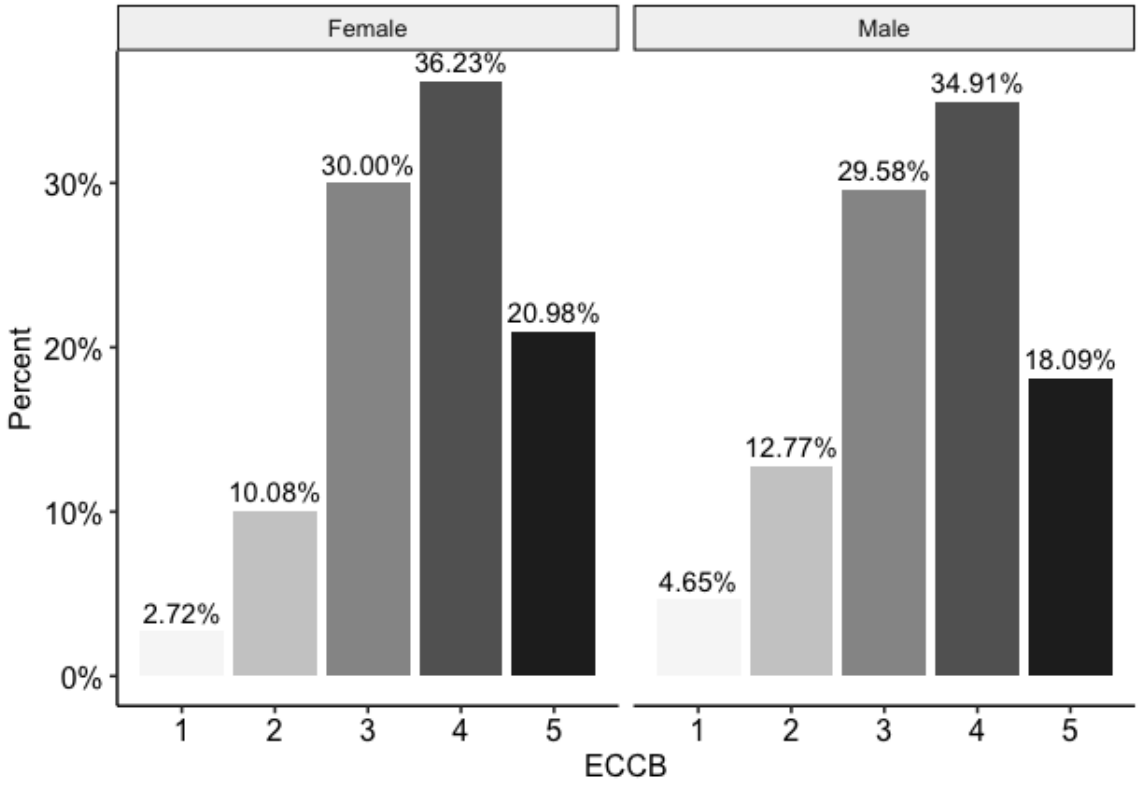

Figure 3.2: *ECCB scores for each gender.*

The next plot looks into the differences in *ECCB* between the different socio-economic classes, shown in figure 3.3. First of all, this plot shows that the middle class is by far the largest group, and the upper and lower class are very small in the data. Regarding *ECCB*, the class distribution of people that score four or five are more or less the same. However when looking at the scores one and two, the proportion of the upper middle and upper class become larger, whereas the middle class proportion becomes smaller for score one. For all other classes, the differences are too small to observe, and are therefore more or less the same for every *ECCB* score. This figure shows that on average the upper middle and upper class score lower on *ECCB*, however the differences are small. Additionally to the plot, the differences in *ECCB* between the different socio-economic classes is tested using a chi-squared test of independence using the 5 *ECCB* categories and the 6 socio-economic classes. The p-value of this test is estimated at 0.09, and therefore the hypothesis of independence between the two variables cannot be rejected at 95% confidence. Thus, the observations based on the figure cannot be confirmed by the chi-squared test, and additional analysis is required to investigate this relationship.

Similarly to socio-economic class, education is also expected to have a positive relationship with ECCB as stated in $H_{3.4}$. When plotting *education* and *ECCB* the same way as in figure 3.3, the plot looks almost identical and is therefore not included. However, when performing a similar

chi-squared test using *education* and *ECCB*, the p-value is estimated at 0.00, and the hypothesis of independence can be rejected. This implies that the *education* categories and *ECCB* levels are dependent of each other. Therefore, it could be the case that higher educated individuals show less ECCB, however this will have to be further investigated using more complex modeling. In order avoid the use of dummy variables, both socio-economic class and education are assumed to be linear, with lower classes and education having a low value and upper classes and higher education having high values. These variables are also scaled between 0 and 1 in order to be consistent with the other variables.

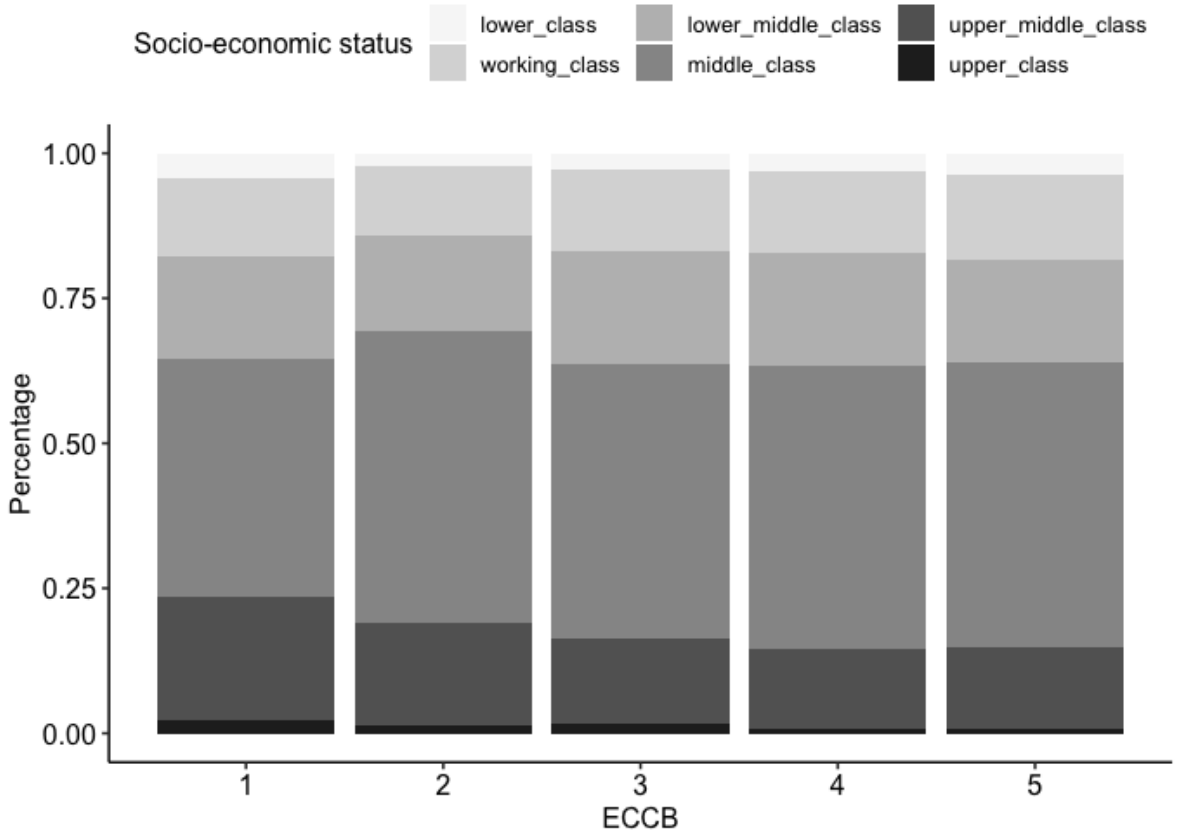

Figure 3.3: *ECCB scores split based on socio-economic status.*

The last series of plots shown in figure 3.4 shows box plots for every *ECCB* score on the x-axis, and the dependent variable on the y-axis. Because the variables are scaled, all y-axes range between 0 and 1. These plots show what the average dependent variable scores are for each of the five levels of ECCB. First of all, these plots shows that some variables have higher means than others. For example, *self-transcendence* shows to have higher scores for all levels of *ECCB* compared to *materialism* for example. furthermore, for some of the variables, a clear pattern emerges. First of all, for almost all variables the *ECCB* level one box plots show a larger interquartile range due to the low number of observations for this score, as also shown in figure

3.2. For the variables *openness*, *agreeableness*, *quality consciousness*, *health consciousness*, *self-transcendence* and *conservation* a distinct upwards trend can be seen in the plots. This indicates that for these variables, people that have a higher level of ECCB also have a higher level of these variables, suggesting a positive relationship. The inverse can be said for *materialism*, *consumer innovativeness* and *self-enhancement* where a negative relationship can be observed. However, the significance of these suggested relationships will have to be tested with the methodology explained in the next section.

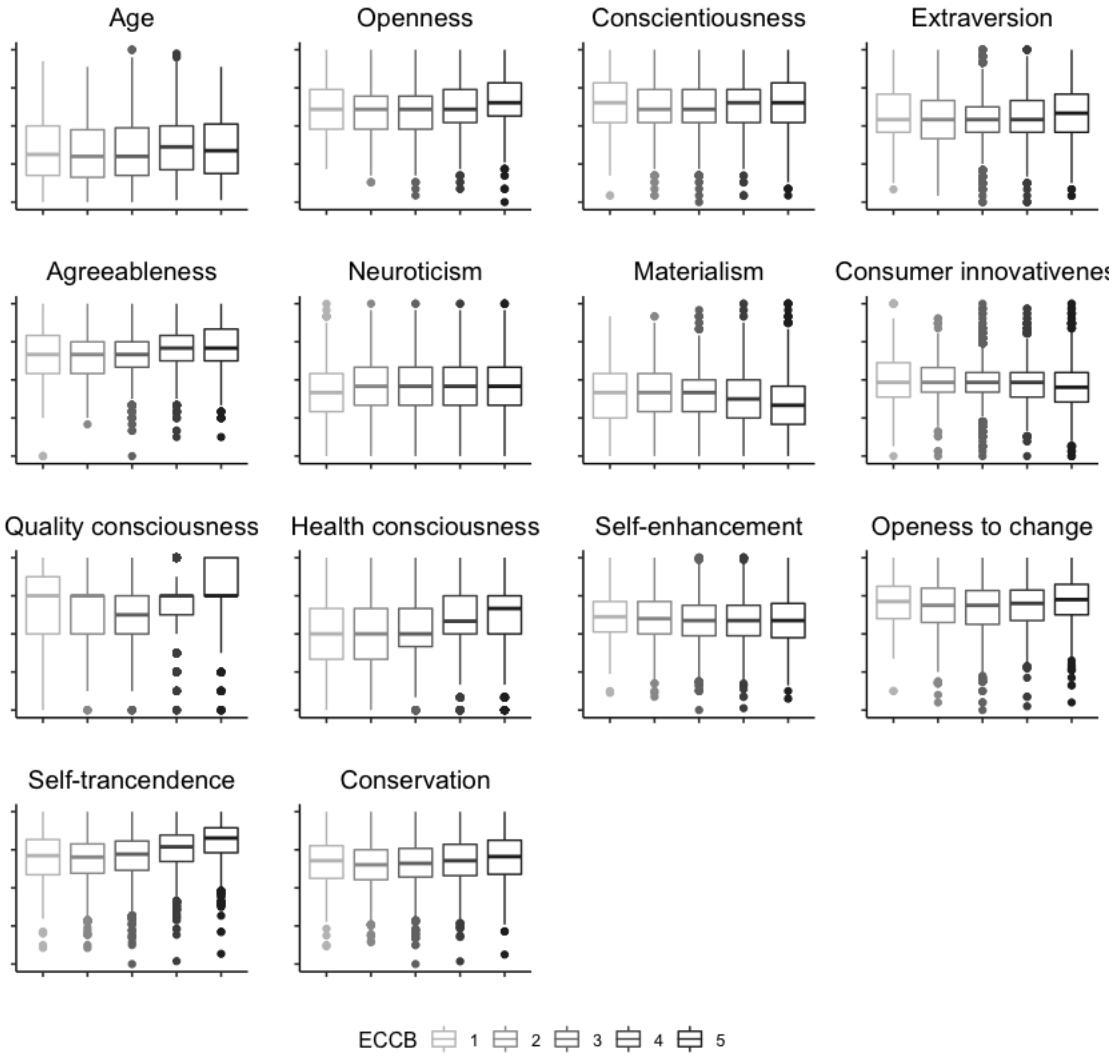

Figure 3.4: *ECCB scores boxplots for all explanatory variables.*

3.4 Methodology

In order to test the hypotheses stated in the theoretical framework, a modeling approach is required that can measure the relationships between ECCB and the explanatory variables. However, since the scope is also set on differences between countries, this factor also needs to be accounted for in the modeling. Therefore, a multi-level modelling approach becomes suitable for the data (Raudenbush and Bryk [2002]). The general individual level 1 formula for this model is shown in equation (1):

$$ECCB_{ij} = \beta_{0j} + \sum_{k=1}^{n} \beta_{kj} x_{kij} + \epsilon_{ij} \tag{1}$$

This equation estimates the ECCB of individual i in country j, using an intercept β_{0j} for every country j, and a β_{kj} slope for each of the n individual level independent variables x. However, since a multi-level model allows the coefficients to vary for the different countries based on the country differences, these coefficients can be represented by their own equations. The first model that will be considered is a multi-level model with random intercepts and fixed slopes. This model assumes that the relationships between $ECCB$ and the explanatory variables are the same, but can vary in size. To capture this variation, the random intercept is estimated at the country level 2 using the formula in equation (2):

$$\beta_{0j} = \gamma_{00} + \sum_{h=1}^{m} \gamma_{0h} z_{hj} + \upsilon_{0j} \tag{2}$$

Here, γ_{00} is the fixed effect for all countries, and the between country variation in intercepts is explained by all m country specific variables z such as the Hofstede dimensions, and a country-specific random effect υ_{0j}. This is a relatively simple model to estimate and interpret, but still holds information about the differences between countries. However, the more realistic scenario is that the relationships between ECCB and some of the explanatory variables are different between countries. In order to model these differences, the slope of the model also has to be estimated differently for every country. These slope coefficients can also be represented at the country level 2 using the formula in equation (3):

$$\beta_{kj} = \gamma_{k0} + \sum_{h=1}^{m} \gamma_{kh} z_{hj} + \upsilon_{kj} \tag{3}$$

Here, γ_{k0} is a fixed effect for all countries for each variable, and the between country variation in slopes is explained again by all m country specific variables z, along with a random effect υ_{kj} for every individual level variable k. To summarize, the ECCB of a person i in country j can

be explained by the fixed effects represented by γ that are related to country-specific variables z, and the random effects represented by υ, which are the unexplained differences in intercepts and slopes between countries.

For this study, the first step will be to set up a so-called empty model or unconditional means model. This is a model without any variables, and tries to explain differences in *ECCB* solely based on the country differences. This model yields information of the proportion of variance in ECCB within countries and between countries. Next, a model will be estimated using random intercepts as stated in equation (2), but fixed slopes as shown in equation (1). This model assumes that the relationship between x and *ECCB* is the same for every country, but can differ in size based on the country variables z. This is a relatively simple model to estimate and interpret, but can yield an initial insight regarding the between country differences. Lastly, a model with both random intercepts and random slopes will be estimated, in order to capture the all the differences in relationships between countries. This is the most complex model, and can therefore be harder to interpret. However, it will yield the most accurate representation of the data, as it allows for maximal variability between countries.

In order to assess the performance of the models and it's coefficients, the p-values of the coefficients will be evaluated. These p-values will be estimated using the Shattertwaite degrees of freedom approximation (Satterthwaite [1946]), which allows p-values to be estimated for the fixed effects. For the model performance, the models will be evaluated using an anova likelihood ratio test, and comparing the resulting Akaike information criterion in order to see which model performs better.

4 Results

The following section will present the results of this thesis. Firstly, the random intercept models will be discussed after which the random slope models will be presented. Using the models, this section will conclude with a discussion of the hypotheses formulated in the theoretical framework, and present the complete tested framework of effects using a figure.

4.1 Random intercepts models

To start off, the unconditional means model is estimated, using *ECCB* as explanatory variable and *country* as grouping variable. Using this model, the intra-class correlation (ICC) can be calculated, which is the ratio of the random intercept variance compared to the total variance. The resulting model and ICC is shown in table 4.1. The results show that overall mean ECCB of the dataset is 3.563, with a country variance of 0.044 and a residual variance of 1.047. The ICC is reported to be 0.042, indicating that only 4.4% of the variance in ECCB can be explained by the between-country differences, while the other 95.6% of variance is due to within-country differences. This suggests that the country of living can barely explain differences in ECCB, which is consistent with the high standard deviations shown in figure 3.1.

The next column in table 4.1 shows the results for the random intercepts model including all level 1 variables. The results shows that the random effects decrease even further to a country variance of only 0.031, and residual variance of 0.885. Furthermore, the AIC increases significantly compared to the unconditional means model, and therefore most of the variance can be explained by the coefficients of the fixed effects. The largest significant coefficients that stand out are for *self-transcendence* and *conservation*. People that scored the highest on *self-transcendence* tend to have an *ECCB* of 2.7 points higher on average compared to those who scored the lowest, ceteris paribus. On the other hand, people that score the highest on *conservation* have an *ECCB* of 1.1 points lower than those who scored the lowest on this variable, ceteris paribus. Other significant negative effects on *ECCB*, ranked from largest to smallest, are the variables *self-enhancement*, *consumer innovativeness*, *openness to change*, *upper middle class* and *materialism*. The other significant positive effects shown in the model ranked from largest to smallest are *quality consciousness*, *health consciousness*, *openness*, *neuroticism*, *agreeableness* and being *female*. *Age* also has a positive effect, however it is small and also the least significant, and is therefore not as influential as the other variables mentioned.

The last column in 4.1 shows the results from the random intercepts model, including both level 1 and level 2 variables. The level 2 variables are added only to the model if they are

significant, based on trial and error. The random country variance in this model decreases even further, indicating that the country level variables capture some variance that is due to country differences. All the level 1 variables fixed effects coefficients are very close to the model without the level 2 variables, and the p-values are also the same. Regarding the coefficients of the level 2 variables, the most significant one is *power distance*, with a negative effect indicating that people from countries with a larger power distance tend to engage in less ECCB. Another variable with a significant negative effect on *ECCB* is *GDP per capita*. This coefficient shows that people from less wealthy countries tend to engage in less ECCB. The last level 2 variable that is significant only at 90% confidence is *indulgence*, with also a negative effect on *ECCB*. The other level 2 variables show not to be significant, and it suggest that the country differences do not account much for the variance in *ECCB*.

When comparing the models with and without the level 2 variables, it can be observed that the level 1 fixed effects coefficients are more or less the same, and only three of the level 2 variables show a small negative effect on *ECCB*. Looking at the AIC of both models, the difference is only 6 points, indicating that the models are more or less the same, with the model with the level 2 variables being slightly better. Therefore, these initial results show that the within-country differences are much bigger than the between-country differences, and the level 1 variables variables can explain these differences quite well.

Table 4.1: Random intercept models.

Random effects	Unconditional means	Level 1 predictors	Level 1 & 2 predictors
Groups	Variance	Variance	Variance
Country	.044	.031	.019
Residual	1.047	.885	.883
ICC	.042		
Fixed effects	Coef. (SE)	Coef. (SE)	Coef. (SE)
Intercept	3.563 (.044)***	1.930 (.101)***	2.447 (.198)***
Age		.079 (.048)	.080 (.048)*
Female		.043 (.018)**	.042 (.018)**
Household size		-.110 (.067)	-.111 (.067)*
Socio-eco. status		-.021 (.042)	-.022 (.042)
Education		-.016 (.039)	-0.011 (.039)
Openness		.378 (.062)***	.378 (.062)***
Conscientiousness		-.090 (.061)	-.089 (.061)
Extraversion		-.004 (.055)	-.007 (.055)
Agreeableness		.161 (.073)**	.169 (.073)**
Neuroticism		.227 (.054)***	.228 (.054)***
Materialism		-.146 (.060)**	-.152 (.060)**
Consumer innov.		-.494 (.068)***	-.486 (.068)***
Quality consc.		.728 (.047)***	.728 (.047)***
Health consc.		.701 (.045)***	.696 (.045)***
Self-enhancement		-.797 (.096)***	-.801 (.096)***
Openness to change		-.288 (.102)***	-.277 (.103)***
Self-transcendence		2.710 (.107)***	2.714 (.107)***
Conservation		-1.069 (.099)***	-1.074 (.099)***
Power distance			-.489 (.202)**
Indulgence			-.282 (.160)*
GDP per capita			-.432 (.165)**
Log likelihood model performance			
AIC	38502	36291	36285

*P-value<.1, **P-value<.05, ***P-value<.01

4.2 Random intercepts and slopes models

The next step in the modeling is to add random slopes for the level 1 variables to the model. Because there are only 28 countries in the dataset, including all random slopes for every variable in one model will make the model over fitted. Therefore, each random slope will be estimated using a separate model with only a random intercept and the random slope of that variable, while all other variables remain fixed. The resulting fixed and random effects and the AIC of these models is reported in table 4.2.

Table 4.2 shows that some of the variables have a large random variance across countries. For example, *consumer innovativeness* has a random variance of .411 suggesting that the negative effect of this variable on *ECCB* varies largely between countries. Other variables with a relatively large random variance are *age*, *household size*, *openness* and *agreeableness*. On the other hand, variables such as *self-enhancement* show to have a very low random variance, suggesting that these effects are stable between different countries. Interesting to note from the table is that all random intercepts correlate negatively with the random slopes. This implies that countries who had higher intercept values for *ECCB* have smaller coefficient values for the dependant variable. The rows containing the model for the *Quality consciousness* and *conservation* variables shows no correlation. This is due to this particular model not converging, suggesting that the random effects of this variable are very small. Regarding the fixed effects, some effects that are significant in the random intercept model are not significant when incorporating a random slope. For example, none of the demographic variables prove to be significant when accounting for random effects, indicating that these effects are inconsistent between the different countries. Overall, the fixed effects are very similar to those in the random intercept model, however the significance has reduced for some variables.

Regarding the model performance, the AIC varies substantially among the different models. In general, almost all of them are lower than the random intercept model meaning that incorporating a random slope does improve the models performance, for some variables better than others. For example, the lowest AIC is measured for the random slope model for the variable *age*. This slope has a large variance between countries, and when zooming in it can be observed that for Russia the slope for age is large and positive, while for countries such as Italy or Ireland this slope is negative. This shows that the effect of age varies significantly, and incorporating it as a random slope improves the model performance.

Table 4.2: Random intercept and slope models.

Random slopes model	Fixed effects	Random variance	Correlation w/ intercept	AIC
Age	.029	.318	-.79	36184
Female	.035	.022	-.40	36248
Household size	-.112	.206	-.28	36269
Socio-eco. status	-.022	.007	-1.00	36285
Education	-.017	.007	-.91	36286
Openness	.391***	.248	-.93	36248
Conscientiousness	-.082	.191	-.89	36256
Extraversion	.008	.162	-.87	36264
Agreeableness	.137	.261	-.91	36254
Neuroticism	.247***	.100	-.54	36269
Materialism	-.147	.142	-.79	36270
Consumer innov.	-.552***	.411	-.90	36228
Quality consc.	.740***	.040		36293
Health consc.	.698***	.082	-.78	36266
Self-enhancement	-.802***	.009	-.60	36289
Openness to change	-.270**	.137	-.90	36273
Self-trancendence	2.714***	.180	-.92	36272
Conservation	-1.074***	.043		36296

*P-value<.1, **P-value<.05, ***P-value<.01

Using the results from the previous regressions, a combined model of some random slopes and fixed slopes is estimated. This model will estimate a random slope for variables that have a random variance larger than 0.2, and a fixed slope for the other variables. As aforementioned, too many random slopes will make the model over fitted, which is why only the variables with a random variance larger than 0.2 will have a random slope. The results of this model are shown in table 4.3. The fixed effects estimated by the model are very similar in size too all previous models estimated, but have a lower significance for some. For example, where the random intercept models showed significance for *age*, *female* and *household size*, this model only shows significance for *female* at 90% confidence. Therefore, when incorporating multiple random slopes, demographics do not seem to hold much significance anymore compared to the other variables such as the basic values that remained highly significant. Interestingly the

previously significant effect of *indulgence* is not present in this model, which states that only the country variables *GDP per capita* and *Power distance* are significant. The AIC for this model is estimated at 36089, which is much lower than all previous models, indicating that this model has the best fit for the data.

Table 4.3: Random intercepts and multiple random slopes model.

Variable	Fixed effects (SE)	Random variance
Intercept	2.532 (.213)***	.328
Age	.016 (.112)	.281
Female	.031 (.018)*	
Household size	-.104 (.104)	.172
Socio-eco. status	-.012 (.042)	
Education	-.007 (.039)	
Openness	.429 (.100)***	.165
Conscientiousness	-.119 (.061)**	
Extraversion	-.003 (.054)	
Agreeableness	.125 (.110)	.185
Neuroticism	.217 (.054)***	
Materialism	-.148 (.059)**	
Consumer innov.	-.526 (.132)***	.348
Quality consc.	.705 (.047)***	
Health consc.	.727 (.045)***	
Self-enhancement	-.857 (.095)***	
Openness to change	-.267 (.102)***	
Self-trancendence	2.696 (.107)***	
Conservation	-1.057 (.098)***	
Power distance	-.548 (.184)***	
Indulgence	-.151 (.148)	
GDP per capita	-.552 (.152)***	

*P-value<.1, **P-value<.05, ***P-value<.01

In order to gain an additional insight about how the effects differ from country to country, the relationship between *ECCB* and the explanatory variables have been examined for each country independently using an OLS regression. Due to the low sample sizes for some of the countries the significance of most variables is low. Nonetheless, by plotting a heatmap of the

coefficients of all variables for every country, it can be observed how the variables affect *ECCB* for every country. The heatmap is shown in figure 4.1.

First off all, the plot clearly shows that the effects with a low random variance in table 4.2 have similar coefficients for most of the countries. For example, the strong positive effect of *self-transcendence* is evident in almost every country, as is the negative effect of *self-enhancement* and *conservation*. Furthermore, *health consciousness* and *quality consciousness* also seem to have similar positive effects for all countries. On the other hand, the coefficients of variables with a large random variance such as *consumer innovativeness* differ substantially between the countries, and even differ in sign for some. For some of the insignificant effects such as *education* and *socio-economic status*, the coefficients are very small and are equally positive as negative which can be seen from the plot. Therefore, this figure confirms the previous results from the multi-level approach.

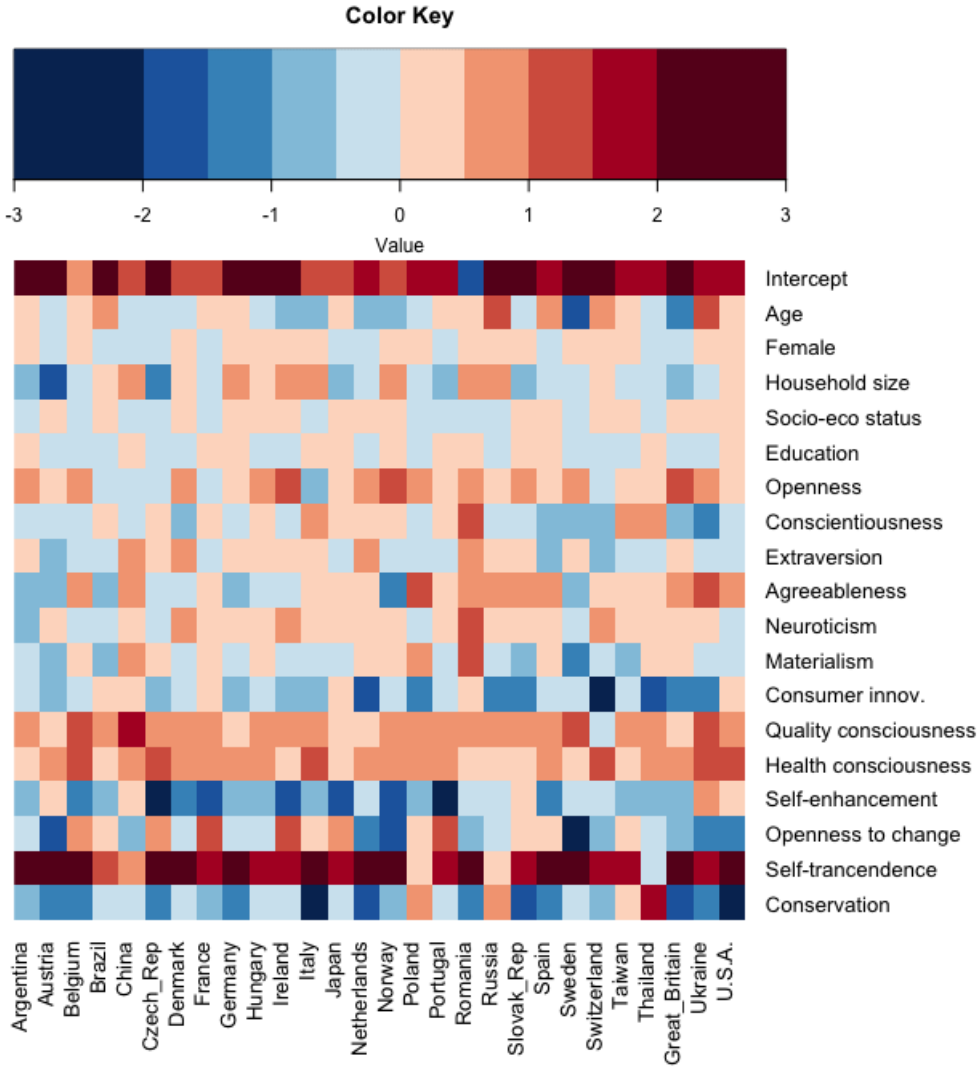

Figure 4.1: *Heatmap of OLS regression coefficients.*

4.3 Hypothesis testing

The theoretical framework posed a number of hypotheses to help test the relationship between ECCB and the explanatory variables. This section will evaluate these hypotheses in order to see whether the expectations match with the results. The first set of hypotheses related to the Schwartz value domain, and were stated as follows:

- $H_{1.1}$: 'The value domains *openness to change* and *self-transcendence* positively affect ECCB.'
- $H_{1.2}$: 'The value domains *conservation* and *self-enhancement* negatively affect ECCB.'

Regarding $H_{1.1}$, this hypothesis is only partly correct. *Self-transcendence* shows to have a very large significant positive effect on *ECCB*, as stated by the fixed effects. Furthermore, the random effects show that this variable is relatively stable between the countries, indicating that this is a global effect. However, *openness to change* shows to have a significant negative effect on *ECCB*, although this effect is relatively small. The random variance of this variable is small, however because the effect itself is also small, the total effect does vary from country to country, with most countries reporting a negative effect, but some reporting a positive effect. This result was not expected by the hypothesis, and is therefore an interesting insight. $H_{1.2}$ proves to be correct by the results, with both *conservation* and *self-enhancement* showing a large significant negative effect on *ECCB*. The random variances of these variables are very small, and therefore this effect is also consistent between the different countries.

The second set of hypotheses related to the consumer constructs and personality traits, which resulted in the following list of hypotheses:

- $H_{2.1}$: 'The personality traits *agreeableness*, *conscientiousness* and *openness* positively affect ECCB.'
- $H_{2.2}$: 'The consumer construct *materialism* negatively affects ECCB.'
- $H_{2.3}$: 'The consumer construct *consumer innovativeness* positively affects ECCB.'
- $H_{2.4}$: 'The consumer construct *quality consciousness* negatively affects ECCB.'
- $H_{2.5}$: 'The consumer construct *health consciousness* positively affects ECCB.'

Based on the fixed effects, $H_{2.1}$ is partly correct with *openness* showing a significant positive effect. However, the random effect of this variable is very large, and for some countries these effects are positive and for some these are negative. Furthermore, *agreeableness* has a significant positive effect in the random intercept model, but not the random slopes model, which

makes is inconsistent. Therefore, only *openness* do seem to affect *ECCB*, although the sign and magnitude vary between countries. Regarding *conscientiousness*, only the final random slopes model shows significance for this values where the other models do not, making it inconsistent as well. However, another variable from the 'Big Five', *neuroticism*, does show to have a significant positive effect on *ECCB* for every model considered. Therefore, only *openness* and *neuroticsm* have a consistent significant positive effect on *ECCB*.

The negative relationship between *materialism* and *ECCB* as stated in $H_{2.2}$ is supported by the fixed effects in the models. However, this variable has a substantial random component that varies between countries. Nonetheless, most countries show to have a negative relationship and $H_{2.2}$ can therefore be accepted. Regarding $H_{2.3}$, this hypothesis cannot be verified. The fixed effects show instead a negative relationship between *consumer innovativeness* and *ECCB*, and moreover this relationship has the highest random variance of all variables. Nonetheless, for the majority of countries the relationship is negative, but with large differences in size.

The last two hypotheses of this set $H_{2.4}$ and $H_{2.5}$ expected a negative relationship between *quality consciousness* and *ECCB* and a positive relationship between *health consciousness* and *ECCB*. The results show that these relationships are actually very similar, and the fixed effects state a large positive relationship between both variables and *ECCB*. Moreover, the random variance for both variables is fairly low, which states that these relationships are similar for all countries. Therefore, $H_{2.4}$ is rejected due to the relationship being positive instead of negative, and $H_{2.5}$ is accepted.

The third set of hypotheses expressed the expected relationships between the socio-demographic variables and *ECCB*, and were stated as follows:

- $H_{3.1}$: 'Females are more likely to express ECCB'
- $H_{3.2}$: 'Household size is positively related to ECCB.'
- $H_{3.3}$: 'A higher social-economic status positively affects ECCB.'
- $H_{3.4}$: 'A higher education level positively affects ECCB.'

$H_{3.1}$ can be accepted, as the fixed effect show a positive significant relation, although it is very small compared to the other coefficients. The random variance of this effect is also small between countries, and the effect therefore similar in every country. Regarding $H_{3.2}$, the results are unable to prove any significant relationship existing between *household size* and *ECCB*. Besides the fixed effect not being significant, the random component is also very large and therefore this hypothesis cannot be accepted.

As for $H_{3.3}$ and $H_{3.4}$, both hypotheses expected a positive relationship with *ECCB*. However, the results did not show any support for either of the two. The relationship between *socio-economic status* and *ECCB* turned out to be very small and insignificant. As for *education*, there is also no evidence for any significant relationship between *education* and *ECCB*, and thus both $H_{3.3}$ and $H_{3.4}$ cannot be accepted.

The last hypothesis posed the expected relationships between the Hofstede cultural dimensions and *ECCB*, and was stated as follows:

- H_4: 'Individuals in countries with a high level of *masculinity*, *power distance* and *individualism* show less ECCB.'

Although no significant relationship could be found between *masculinity* and *individualism* and *ECCB*, *power distance* did in fact show a negative effect on *ECCB*. Furthermore, two other variables that were not expected based on the literature showed to have a negative effect on *ECCB*, which are *indulgence* and *GDP per capita*, although the significance of *indulgence* is only with 90% confidence for the random intercepts model, and insignificant for the random slopes model. Therefore, people living in countries with a large power distance and a high GDP per capita have a lower level of ECCB on average.

Figure 4.2 shows a summary of the results, where the significant effects are ordered based on being either a positive or negative effect on ECCB, and either low or high random variance between countries.

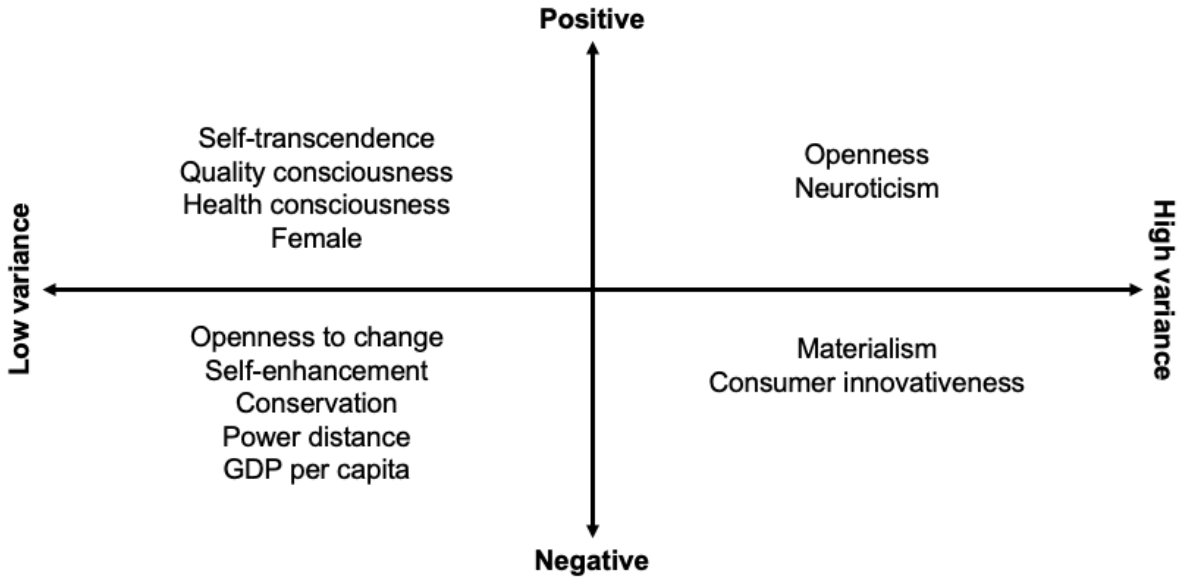

Figure 4.2: *Summary of variable relationships.*

5 Conclusion and discussion

5.1 Conclusion

This thesis investigated the factors that drive ECCB on a global scale. The goal of this study was to create a data driven framework of general values and consumer values, as well as sociodemographic and cultural variables that positively or negatively impact ECCB. Using a large dataset and a multilevel approach, many significant relationships were uncovered and presented in the results. The most important results are the effects on ECCB that are both significant and stable between the different countries. This turned out to be the case for all Schwartz value dimensions. For all countries considered, the self-transcendence domain has the highest positive relationship with ECCB. People that value benevolence and universalism are very likely to have a high level of ECCB, no matter the culture. This conclusion is unsurprising, due to these values being associated with an appreciation of the people and environment around you. However, pursuing the other three value domains negatively affects ECCB for all countries, with conservation and self-enhancement being the largest effect. People that value power, achievement or tradition find their own development and achievement more important than the world around them, and therefore show less ECCB. The negative effect of openness to change can be considered surprising, as environmentalism is often associated with a change in behaviour and environment. However, this negative effect is the smallest of the four dimensions and also has the largest between country variance, which suggest that the other three dimensions are the most important driving values for ECCB. The findings regarding the Schwartz value dimensions turn out to be consistent with previous studies, and shows the robustness of the SVT on a global scale.

Other effects that are consistent among the different cultures are health and quality consciousness and gender. The results show that people who value their health and the quality of a product are more likely to engage in ECCB, for all countries considered. Organic foods are often considered as being healthier, which could be an explanation for this effect. As for the quality, this result is unexpected due to green products being considered as lesser quality as stated by Lin and Chang [2012]. This study shows that this is not the case based on the data, and quality conscious consumers are in fact more likely to engage in ECCB. As for gender, in general females tend to be more environmentally conscious than males, although this effect is very small compared to the other measured effects.

Besides the effects stated above that are similar for all countries considered, there are also effects present that are significant, but differ substantially between countries. Two out of the

'Big Five' personality traits turned out to have a significant positive effect on ECCB, being openness and neuroticism. However, these positive effects can be very small in some countries and very large in other countries. On the other hand, materialism and consumer innovativeness turn out to have a negative effect on ECCB, an effect which also differs substantially in size between countries. Materialistic people care more about possessions than the environmental impact of those possessions, and in turn show less ECCB. The negative relationship between consumer innovativeness and ECCB is unexpected. Although innovative consumers are more likely to try new products, these products do not have to be 'green products'.

This study also found significant results for cultural and country specific factors that can impact the ECCB of people living in it. Although the initial results showed that the between-country difference in ECCB are small, the Hofstede dimensions do tend to have some explanatory power. People living in countries with a large power distance and/or high GDP per capita tend to have lower ECCB. People that live in a country with a large power distance could feel like their behaviour does not have an impact, due to the large power of the government and little power of the people, which leads to the population engaging in less ECCB themselves. As for rich countries, they are often more engaged in green initiatives and clean energy, while the people themselves engage in less ECCB compared to the poorer countries. An explanation could be that people living in rich countries know that their government spends many resources on sustainability, and therefore the people feels less of a need to engage in ECCB.

Placing this study in a scientific context, the results are in line with papers by Grunert and Juhl [1995] and Schultz et al. [2005], who also found robust effects of the Schwartz values and ECCB or environmentalism in general. Furthermore, the conclusion by Diamantopoulos et al. [2003] stating that ECCB is hard to explain with demographics alone is also supported by this study, considering the low significance of all socio-demographic variables in the models. Adding to the previous studies, this research has broaden the scope by including more variables in one framework, and tested it using multiple countries and cultures. Therefore, the results are more robust for sampling bias and omitted variable bias. In a social context, this study has shown that ECCB is driven more by core values rather than nationality or education. This makes stimulating ECCB difficult due to the values being not easily manipulated. Therefore, in order to effectively combat climate change, consumers have to be restricted to sustainable alternatives, because if consumers have a choice, they will not be easily persuaded to choose the green alternative if they do not want to.

5.2 Discussion and suggestions for further research

Due to some limitations in this study, further research could be in oriented in many directions. First off all, the data is collected before 2010, and much has changed in the past 10 years regarding climate and environmentalism. Climate change has also become a more political topic in the past years, especially in the US with differences between the democrats and republicans regarding this topic. Furthermore, the the data could be enriched by including more countries beyond Europe such as African countries, in order to gain a more balanced dataset. Although the data contained many countries, some cultures were not properly represented, and further research could focus on ECCB in developing countries. Also, the variables considered in this framework are by no means complete, and considering other variables could have additional value. For example, political opinion could be added to the model as it could be related to ECCB. Another direction of further research could be based on the significant effects that vary substantially between countries. Although these effects are measured, it is difficult to determine the cause of these differences based on the Hofstede dimensions of 28 countries alone. These relationships could be more thoroughly investigated in order to better model the between country-differences. Lastly, this research measured ECCB using one survey question. Previous research often found a discrepancy between a persons environmental attitude and its behaviour. Therefore, further research could test this framework for both attitudes and behaviour, which could yield interesting results regarding the differences between the factors that drive either green attitudes or behaviour.

6 References

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