Consumer perception and purchasing decisions toward
environmental and animal friendly products : Empirical analysis
in Thailand

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ทัศนคติของผู้บริโภค และการตัดสินซื้อผลิตภัณฑ์ที่เป็นมิตรต่อสัตว์และสิ่งแวดล้อมในประเทศไทย

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>   Environmental and animal issues are huge topics for years. There are lots of papers analyzing about environmental or animal issues these two topics separately. However, this paper combines these 2 aspects together. As those two aspects simultaneously affect our world, this paper initiates to analyze them together. This paper attempts to determine what factors cause Thai people having a high intention of willingness and motivation to buy those products. Also, This paper investigates whether people with high motivation and willingness to buy actually end up performing the purchasing decision or not. The factors that are analyzed in this paper also include eco-literacy, environmental and animal concerns, attitudes, society beliefs, and emotional values. There are 4 factors that have positive statistically significant which are environmental and animal concerns, attitudes, society beliefs, and emotional values, and only eco-literacy that does not influence motivation and willingness. It also finds that motivation definitely leads to the actual action of purchasing as well.

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1. Introduction

There are two things we are currently moving our eyes on, the environment and animal welfare. Environmental concerns have been human issues for a long time (Brown, 2008; Kilbourne and Pickett, 2008). People start to be more acknowledged of global and environmental issues such as global warming, ozone layer depletion, air and water pollution, and many more. (Malik and Singhal 2017) Also, better animal welfare has been getting attention for the past two decades (Lund, Coleman, Gunnarsson, Appleby, Karkinen, 2006) We are still solving this problem to the present day. People start to be closely considerate of what they purchase and consume. As we have been using, spending, consuming a very large amount of products. It leads to several negative impacts for our world, food waste on the environment, and countless numbers of animals suffering from human production practices.

Environmental friendly products or Green products (Chen and Chai 2010) are considered having no or less to be harmful to the environment after use (Moser 2016) such as recyclable packaging, Also, animal friendly products are non-suffering animals in the production lines such as cage-free eggs. And all these friendly products are now continuously growing bigger and bigger (U.S. Department of Agriculture Economic Research Service, 2014) not only in America and Europe but also in Asia as well. As a result, people gradually move to something called environmentally friendly products or green products and animal friendly products more lately.

These both issues of environment and animals are two things that people are concerned about together. However, it is hard to find or maybe there are no research papers that combine both topics of environmental friendly products and animal friendly products together. So, It is one of the motivations to make this research paper. Also, this research will take a look at the factors that will lead to a motivation to purchase environmental and animal friendly products and actual practice purchasing the products from respondents in Thailand. The factors in this research are modified and adapted from previous relevant research. It includes eco-literacy, environmental concern, attitudes, society beliefs, and emotional value. For the motivation to buy, this research will consider the respondent's opinions and thoughts of purchasing the environmental and animal friendly product in several circumstances. However, this

research would like to explore whether the intention and motivation will lead to an actual action of buying or not as well. Respondents might have the intention to buy but not end up buying it. (Shim, Shin et al. 2018) Therefore, an actual purchasing decision in the past of environmental and animal friendly products and certain practices of respondents to purchasing will be considered in this analysis as well.

This research is not only to understand consumer behavior and thoughts toward environmental and animal friendly products but also to open a new market to alternative products businesses targeting eco-friendly sensitive consumers as well. These areas of customer concern give you an opportunity to a new market targets (Pickett-Baker and Ozaki, 2008) However, these kinds of products might raise the cost of production (Giuseppe, Lionel, Riccardo, 2009), this research will help to understand how consumer perceived the importance of environmental and animal friendly products and weigh consumers' perception and purchasing decisions of this kind of products as a new market that might bring sales for the business practices for you in the future. (Suki 2013)

2. Literature Review

As the issues of environment and animal concerns have got more people interested recently. There are lots of research papers mentioning about environmental or animal issues. However, it is hard to find or maybe there are no research papers that combine both environmental and animal concerns together, especially about environmental and animal friendly products. So, it is also one of the motivations to make this research paper. As a result, this part of the literature review will be separated into 2 aspects. The first is about environmental friendly products and the second is animal friendly products.

2.1 Environmental friendly products

More than decades, people shift their intention to environmental concerns (Wang, Liu et al. 2014) and there are a lot of research that is interesting and specific to environmental friendly products. According to a research paper in Australia from Isaac Cheah and Ian Phau (2011), It is true that people start to concern more on environmental issues. (Cheah and Phau 2011) In most of the population's decision making to purchase a product, there will be environmental awareness within also. As well as for business sectors, this can be seen as a market opportunity to target those

who are concerned about the environment and society. Isaac Cheah and Ian Phau (2011) pull out 3 factors that they think will influence the willingness or motivation to purchase environmental friendly products which are eco-literacy, interpersonal influence, and individual oriented. Their results are interesting that those 3 mentioned factors influence to have high willingness to purchase environmental friendly products. Also, positive attitudes will as well lead to action of purchasing those products. Their results imply that people with high knowledge about environmental issues and environmental products will have good attitudes toward these products and end up with a positive attitude and level of awareness about these products as well. However, Isaac Cheah and Ian Phau (2011) and (Gan, Wee et al. 2008) still argue that people that have knowledge or positive attitudes about environmental problems and products might not lead to purchasing action. Buying decisions for these products might not come from just having knowledge alone, It may depend on other factors as well. Similar to Laroche, Bergeron, & Barbaro-Forleo (2001), their result agrees to the same with Isaac Cheah and Ian Phau (2011) that individual concern about environmental issues shapes their decision making when purchasing products (Laroche, Bergeron et al. 2001). In Malaysia, (Al Mamun, Fazal et al. 2018) also analyze factors that influence motivation and willingness to purchase green products well. They conclude that eco-literacy, attitudes, beliefs, perceptions affect willingness to buy, and willingness to buy influences the payment behavior as well. However, Laroche, Bergeron, & Barbaro-Forleo (2001) have additional claims that females married with a child have higher chances to purchase green products.

The results of previous papers have some parts that contradict this paper and some parts correspond with us as well. We got the big similar result with Al Mamun, Fazal et al. (2018) that attitudes and concerns about environmental issues drive the motivation to purchase green products. With Isaac Cheah and Ian Phau (2011) have similar results on society belief, emotional values and attitudes will lead to better decision making on purchasing these products. However, this paper analyzes that eco-literacy or knowledge about environmental products does not lead to motivation and willingness to purchase but Isaac Cheah and Ian Phau (2011) that eco-literacy influences a positive decision making of purchasing instead.

2.2 Animal Friendly products

Animal friendly products is where are product is not harmful to animal on the production process eg. cruelty free test on animal (Doke and Dhawale 2015). Also this type of product is more expensive. (Van Riemsdijk, Ingenbleek et al. 2017) Therefore, it needs more factors to analyze why people want to buy and end up buying it. In business sections, it will definitely raise the cost of production if change the supply chains to animal friendly products. (Nocella, Hubbard et al. 2010). So, it is rational to analyze who will have better intention to purchase these products and what are the factors that make them want to buy animal friendly products. Achabou, Dekhili, & Codini (2020) say that some people will be sensitive when there were informed about animal welfare issues. People with more social value-oriented will have more concerns about this issue. (Achabou, Dekhili et al. 2020) As follow, people with more concerns will have a high willingness to purchase animal friendly products. As well as research from paper Miranda-de la Lama, et al., (2018) that people will need to be informed and educated so that they will decide to buy these friendly products (Miranda-de la Lama, Estévez-Moreno et al. 2019). Group of people who has the willingness to pay actually performed purchasing actions. However, Riemsdijk, Ingenbleek, Trijp, & Veen (2017) People with sensitivity to animal welfare issues and being value-oriented have a high probability to have the motivation of purchasing but the price is what people are concerned about and intervene their decision making. As well as with Graaf, et al., (2016) people with high positive perceptions toward animal friendly products have more intention to purchase them (de Graaf, Van Loo et al. 2016). However, similar to Riemsdijk, Ingenbleek, Trijp, & Veen (2017) and Nocella, Hubbard, & Scarpa (2009) that price or business oriented has a negative correlation with purchasing these animal-friendly products. Additionally, Miranda-de la Lama, et al., (2019) also added that launching responsible marketing strategies to the public will also have positive outcomes and drive customers to purchase as well. (Miranda-de la Lama, Estévez-Moreno et al. 2019)

Even, when compared with environmental friendly product papers, there are fewer animal welfare issue papers. The result of this paper and previous papers are quite similar in those people with high concerns about animals and social value-oriented will buy more of animal friendly products. Additionally, lots of papers mention as well on price and willingness to pay with a higher price or low willingness to pay negatively affect purchasing decision making.

3. Method

3.1 Hypothesis and Research question

There are 2 hypotheses and research questions to reaching the objective of this research paper as illustrated below (Table1.)

Table1. Lists of hypotheses and research question

No	Research Hypothesis	Dependent Variable	Independent Variable	Research Question
1	There are some factors that lead to motivation and willingness to purchase environmental and animal friendly products	eco-literacy, environmental and animal concerns, attitudes, society beliefs, and emotional values.	Motivation and willingness to purchase environmental and animal friendly products	What factors highly lead to the motivation to environmental and animal friendly products?
2	Motivation and willingness to purchase environmental and animal friendly products lead to an actual buying action.	Motivation and willingness to purchase environmental and animal friendly products	Action of purchasing environmental and animal friendly products	Does motivation and willingness of purchasing an environmental and animal friendly product lead to an actual buying decision or not?

3.2 Conceptual frameworks

For a better understanding, the factors that will analyze the correlation with motivation and willingness to purchase include eco-literacy, environmental concern, attitudes, society belief, and emotional value or the left half of the conceptual framework (Figure1). The right half of figure 1 will be for testing an actual action of purchasing with motivation and willingness to purchase.

Figure 1. Conceptual Framework for analyzing motivation, willingness to purchase, and purchasing action of environmental and animal friendly products.
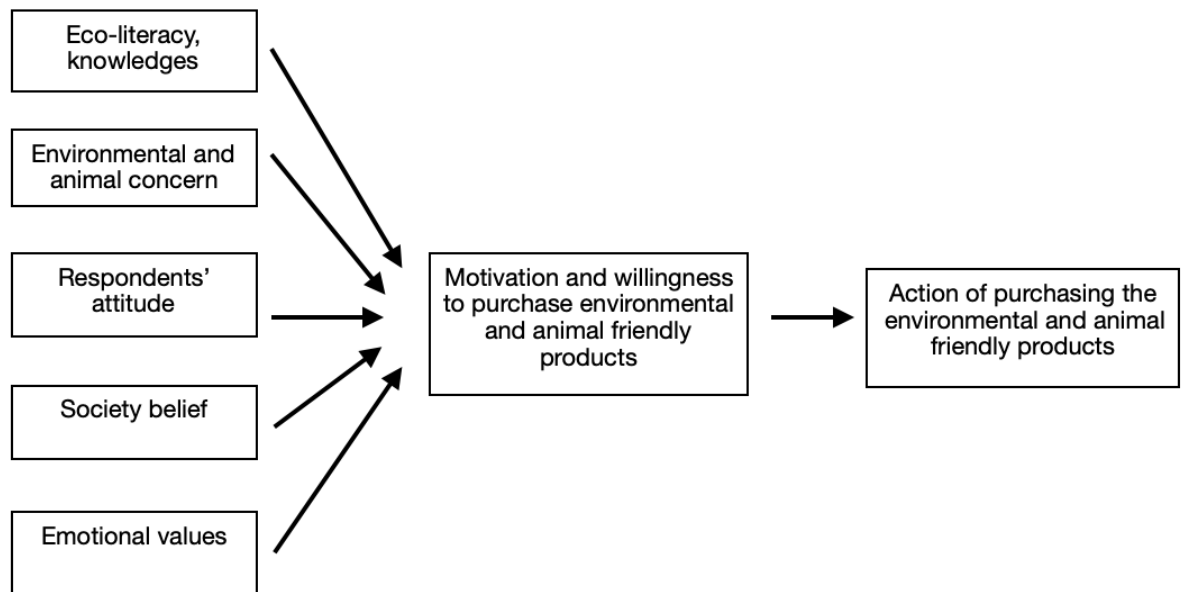
4. Data and Methodology

This paper conducted Quantitative research and used a convenience sample survey to collect cross-sectional data from respondents in Bangkok, Thailand. The purpose of the author is to send out to respondents as much as possible in order to reach out to a larger area of opinions and thoughts of people without considering ages, races, or social class and income in Bangkok, Thailand. As Pearce (1990) stated that green products are more expensive than other convenience products. It is better to include as much as possible a range of respondents in order to gather various levels of thoughts and action. (Pearce, 1990)

The survey was conducted by using Google Survey only due to the pandemic, the actual paper survey might not be appropriate during this time. Also, Google surveys can easily send out to many respondents at a larger scope. The survey link was sent directly to people and asked their hand to forward it further. Also, it was posted online to those interested in filling out this survey. The survey question, apart from general demographic questions, will be Likert scale for respondents to self-score themselves in each factor that might influence them to have the motivation to purchase eco and animal friendly goods, along with a level of motivation to purchase and actual

respondents' experience in the past that purchased environmental and animal friendly products. All the questions in the research survey are included in the next topic.

4.1 Survey Questions

Survey questions are combined of 2 parts, general demographic and factors related to environmental and animal friendly products. The factors will be divided into 7 factors including eco-literacy and knowledge, environmental and animal concerns, respondents' attitudes, social belief, emotional value, motivation and willingness to purchase, and action of purchasing toward environmental and animal friendly products. Respondents will self-score themselves about environmental and animal concerns and products in each factor through questions in each factor. Strongly agree will be accounted for 5 points. Agree will be accounted for 4 points. Neither agree nor disagree will be accounted for 3 points. Disagree will be accounted for 2 points. Lastly, strongly disagree will be accounted for only one point. All questions in this survey were adapted from Lin & Huang (2011) and Mamun, Fazal, Ahmad, Yaacob, & Mohamad (2018). All the questions will be in appendix.

5. Data Result

5.1 Sample Demographic Characteristics

Out of 639 samples, fortunately, there are 628 valid for this research paper which is just 2% invalidate respondents of the total sample.

Figure 2 shows the percentage of respondent age. The majority of respondent are middle age between 30-46 years old up to 45% or 284 respondents. Out of 628 respondent there are 175 or 28% that are age between 18-29 years old. 24% and 3% are 50-65 years old and over 65 years old respectively.

Figure 2. The data summary of respondents' ages
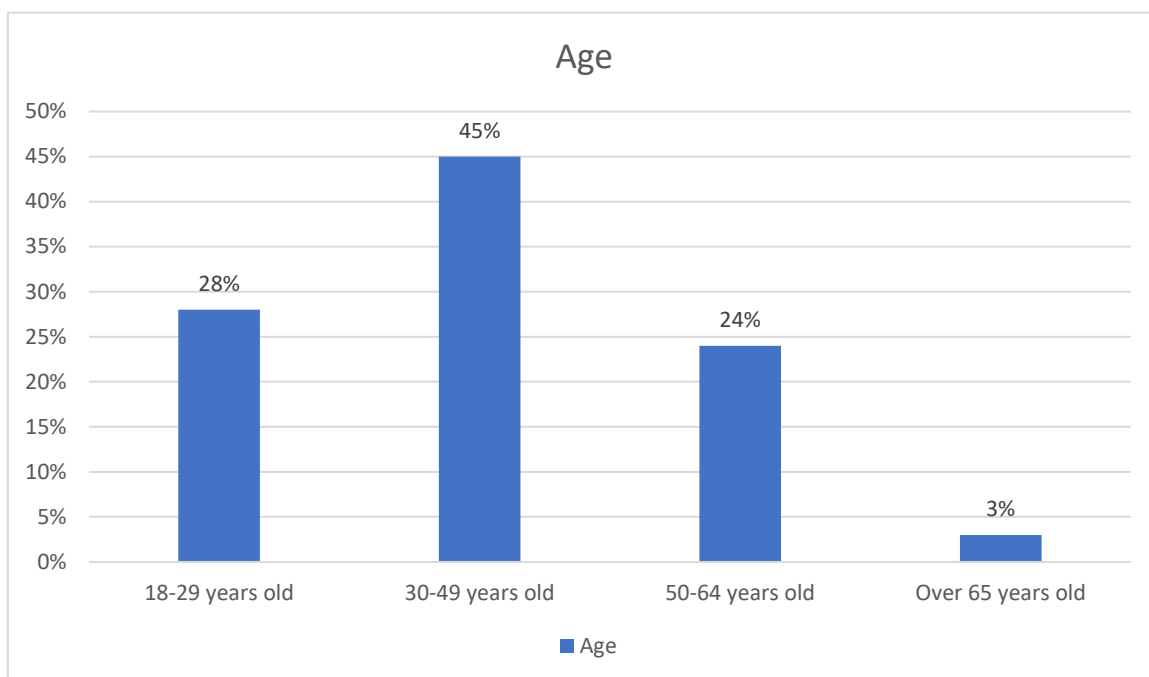
As in figure 3, up to 72% or 450 are female and the rest of 172 or 27% are male. And only 1% or 8 people did not want to specify their gender.

Figure 3. The data summary of respondents' gender
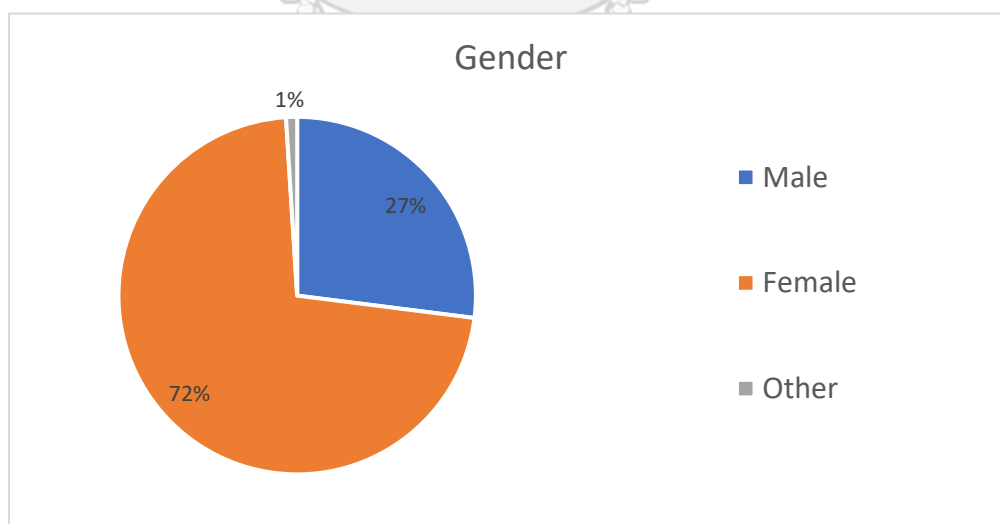
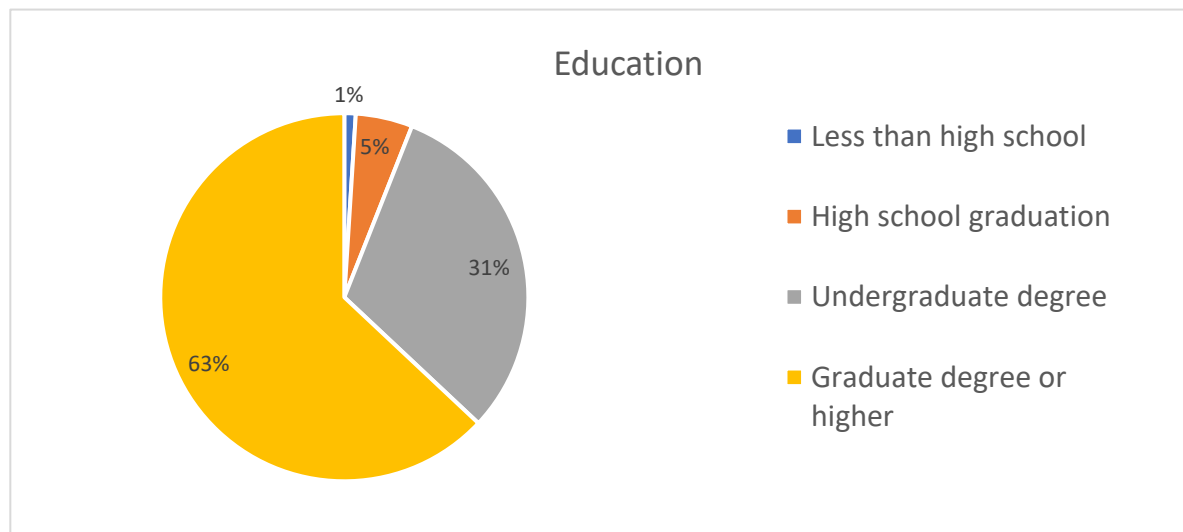Most of the respondents graduate with a master's degree or more in 63% and just only 1% has less than high school graduation. People with an undergraduate degree are 31% which is around half of the graduate degree. It implies that people start to shift their educational backgrounds. (Figure 4)

Figure 4. The data summary of respondents' education background

Refer to figure 5, only 9% or 54 respondents of overall respondents don't have a job and just 6% or 40 respondents were retired. The rest of 85% at least have a job, with a very high level of public employment of 54% or 341 respondents and 130 or 21% are private employed. There are 65 people, only 10%, are self-employed.

Figure 5. The data summary of respondents' employment status
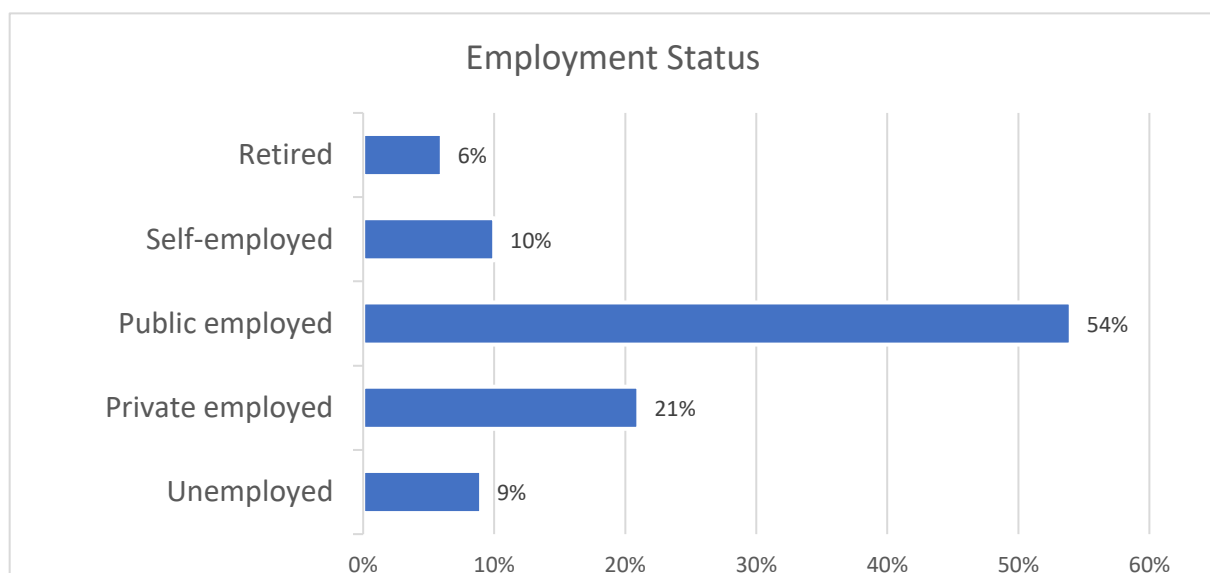
Around half of the respondents have an income of 15,000 THB to 35,000THB. 24% or 152 respondents have income between of 15,001-25,000 THB and 167 or 27% have income of 25,001-35,000 THB. Respondents who had income between 45,001-55,000 THB and 55,001-65,000 THB are 10%, 61 respondents, and 6%, 39 respondents, respectively. However, only 43 respondents or 7% have a high income of over 65,000 THB. (Figure 6.)

Figure 6 The data summary of respondents' income
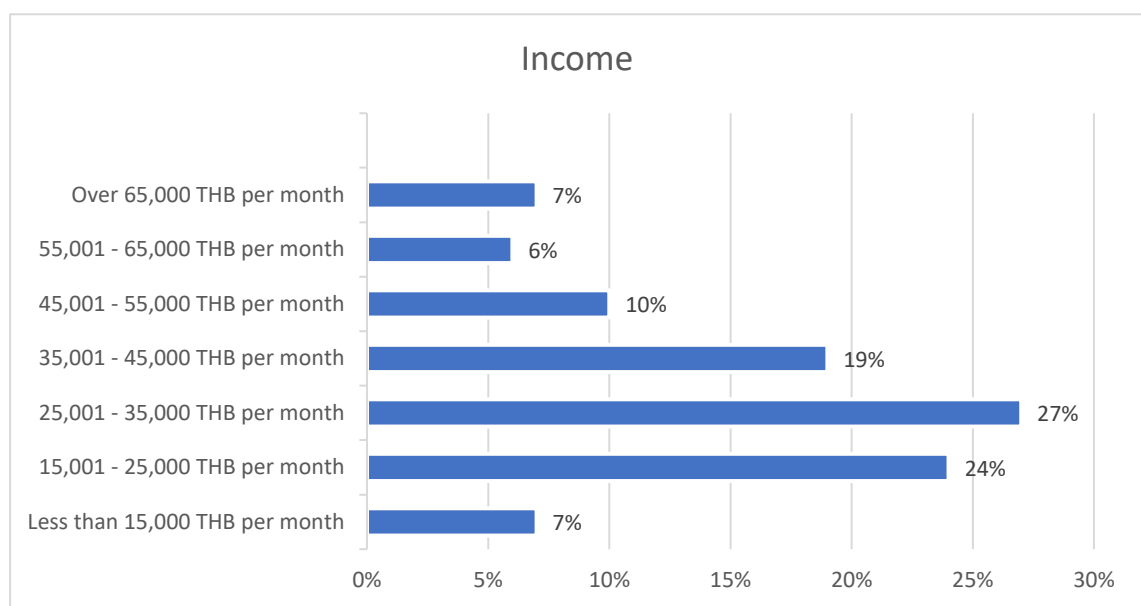
Additionally, 39% or 246 respondents are married, 56% or 246 people are single and widowed, and divorced for 3% and 2% accordingly. Refer to figure 7

Figure 7. The data summary of respondents' marital status
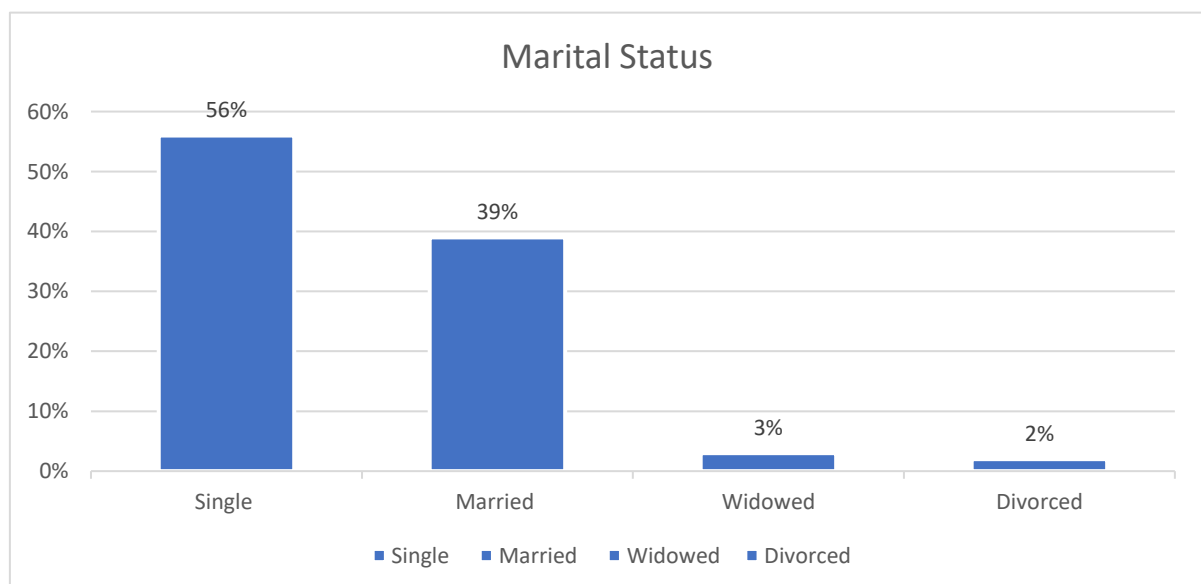
The majority of these respondents don't have kids, or 376 respondents, 60% overall respondents. Having 1 child, 2 children,3 children and 4 or more children are 17%, 19%, 3.6% and 0.4% or 105 respondents, 118 respondents, 28 respondents, and 3 respondents respectively. (Figure 8)

Figure 8. The data summary of respondents' child
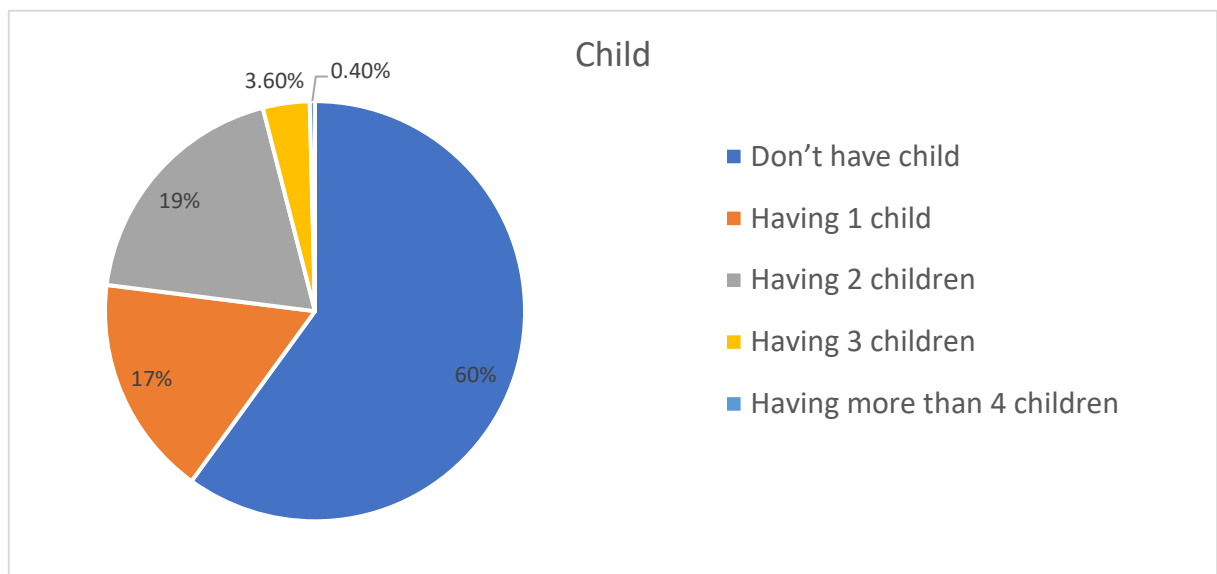
Surprisingly, up to 90% of our respondents have ever used environmental and animal friendly products. However, 10% or 62 respondents still never used environmental and animal friendly products. (Figure 9)

Figure 9. The data summary of respondents that have ever used the products before.
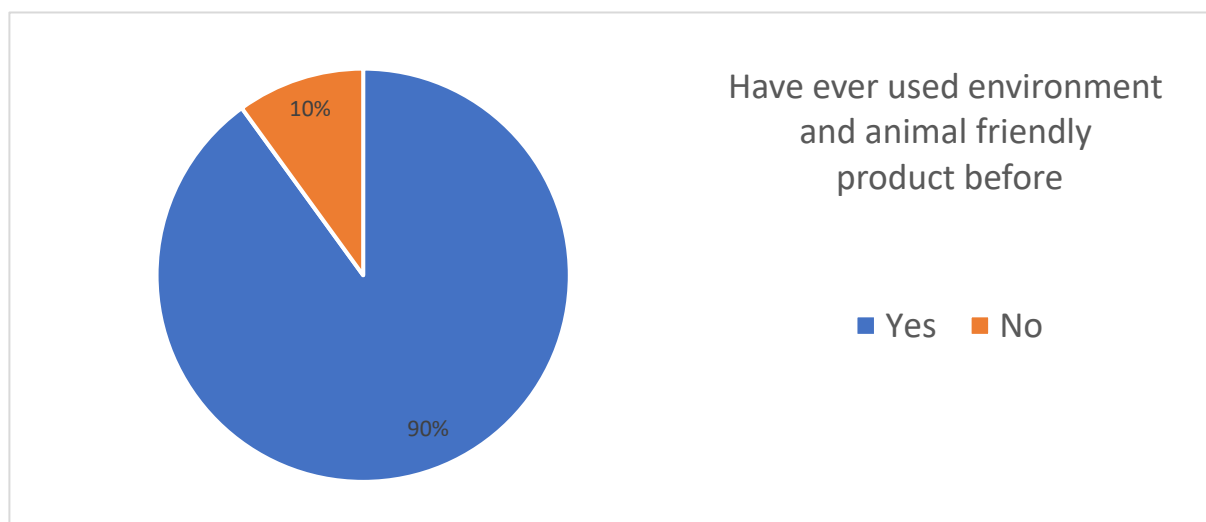
Respondents have lots of experience in using environmental and animal friendly products. Out of valid 628 respondents, there are 284 respondents or around 45% can answer an open question to specify environmental and animal friendly products that they have ever used. For the environmental product side, lots of people have ever chosen Biodegradable packaging products, cloth bags or fabric bags, packaging that has non-toxic production, reusable packages or bottles, paper straw, paper packages, paper cubs, products from organic and sustainable companies, or even reef-safe sunscreen.

For animal friendly products, the majority of people answer animal test free products, cruelty free cosmetics, cage-free eggs, free range egg production, insecticides made from herbs, or even being vegan. The total summarized sample characteristics are include in the appendix.

5.2 Respondents' 7 factors score

The First factor out of the 7 factors is eco-literacy and knowledge about environmental and animal friendly products which contain necessary 4 Likert scale questions. Each and every respondent was required to answer all 4 questions and the answer will be calculated to find an average of the first factor of eco-literacy and knowledge for each respondent. From overall respondents on the first factors, the mean score of all respondents is 3.5. It means the respondents neither agree nor disagree when considering themselves to have knowledge about environmental and animal friendly products. (Table 2.) However, when considering the graph (Figure 10), the majority of respondents, or almost 45% answer agree on having knowledge about environmental and animal friendly products. The graph shows a little skewed to the left. The result of testing data for normality of eco-literacy and knowledge about environmental and animal friendly products shows that it is normally distributed as it has a p-value lower than 0.05.

Table 2. Data summary of eco-literacy and knowledge about environmental and animal friendly products

Factor	Mean	Median	S.D.	Max	Min
eco-literacy and knowledge about environmental and animal friendly products	3.5367	3.75	0.91319	5	1

Figure 10. Eco-literacy and knowledge about environmental and animal friendly products normality distribution graph
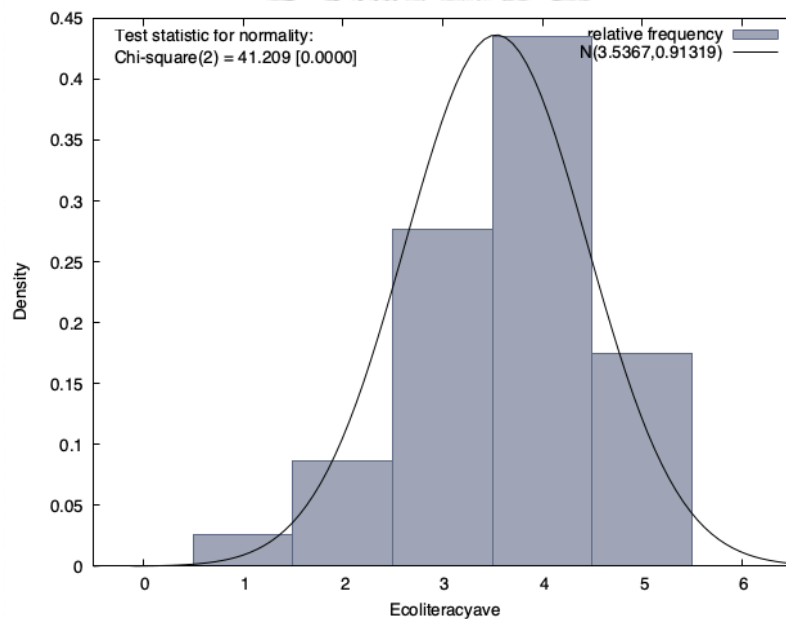
The second factor is environmental and animal concerns which consist of the necessary 5 questions. The answer of 5 Likert scale questions will be calculated for an average to be respondents' score on environmental and animal concerns. The mean answer of overall respondents is up to almost 4 along with a median of 4. (Table 3.) It shows the result that the respondents in this paper agree that they have environmental and animal concerns. When considering the graph (Figure 11.), up to almost 60% of respondents answered agree on having environmental and animal concerns. After testing normality, the environmental and animal concerns factor has a p-value of lower than 0.05. It is normally distributed.

Table 3. Data summary of environmental and animal concerns.

Factor	Mean	Median	S.D.	Max	Min
Environmental and animal concerns	3.9879	4	0.64306	5	1

Figure 11. Environmental and animal concerns normality distribution graph
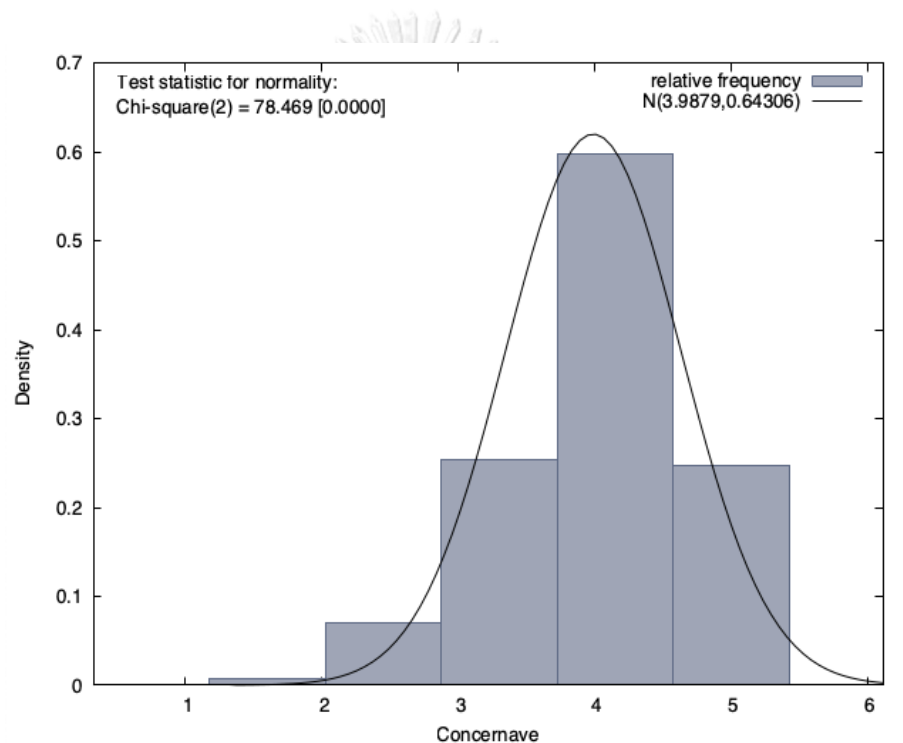
The third factor is respondents' attitudes toward environmental and animal friendly products. According to the survey, this factor also consists of 5 questions as well. All respondents are required to answer all 5 Likert scale questions which the answer will calculate for an average score of each respondent. For this factor, overall respondents have a higher score compared with the previous two factors. The mean and median of the third factor are 4.25 and 4.4 respectively. (Table 4) When checking on the graph, surprisingly, most of the respondents answered agree and strongly agree with more than 40% of respondents answering both of that. It means they all consider themselves as having high and positive attitudes toward environmental and animal

friendly products. Data from respondents' attitudes toward environmental and animal friendly products is also being tested for normality and it passes for normal distribution test or has a p-value of lower than 0.05. (Figure 12.)

Table 4 Data summary of respondents' attitudes toward environmental and animal friendly products.

Factor	Mean	Median	S.D.	Max	Min
Respondents' attitudes toward environmental and animal friendly products.	4.2539	4.4	0.64255	5	1

Figure 12. Respondents' attitudes toward environmental and animal friendly products normality distribution graph
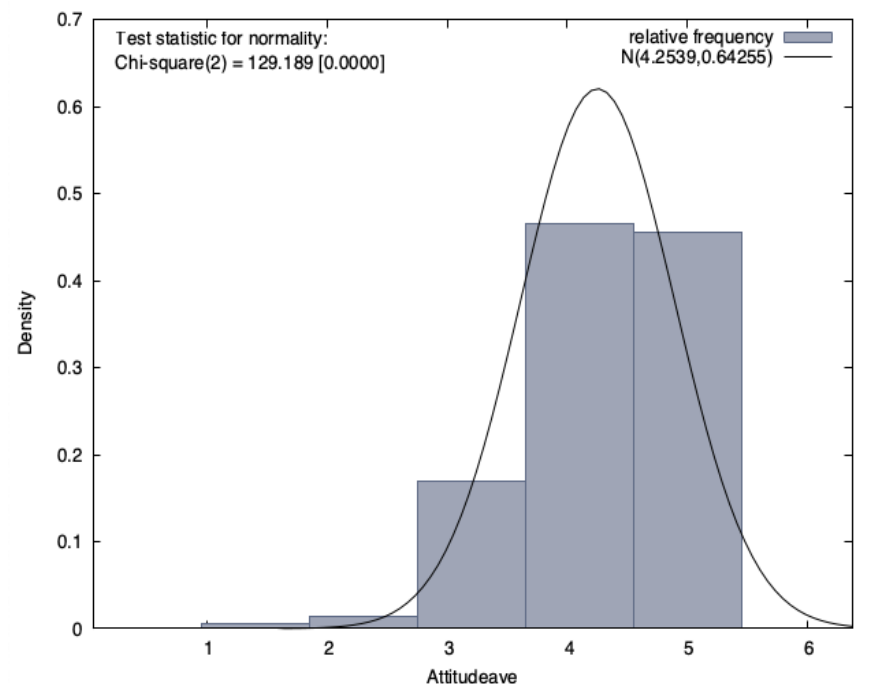
The fourth factor is social belief toward environmental and animal friendly products. This factor has 6 questions that cover all families, relatives, friends, and colleagues. All 6 questions will be converted on average to score each respondent about social belief toward the environmental and animal friendly products. The result

is that mean of respondents' social belief toward environmental and animal friendly products is only around 3.49 with quite a similar median of 3.67. (Table 5.) To see the overview, figure 13. shows results that are quite similar to figure 10 that which is a little bit skewed to the left but the majority answer, or almost 40% of respondents still goes to agree that they have social beliefs toward environmental and animal friendly products. It is still in a pretty good bell shape. The fourth factor of social belief toward environmental and animal friendly products got a p-value lower than 0.05 and pass the normal distribution test.

Table 5 Data summary of social belief toward environmental and animal friendly products.

Factor	Mean	Median	S.D.	Max	Min
Social belief toward environmental and animal friendly products.	3.4883	3.6667	0.97831	5	1

Figure 13. Social belief toward environmental and animal friendly products normality distribution graph
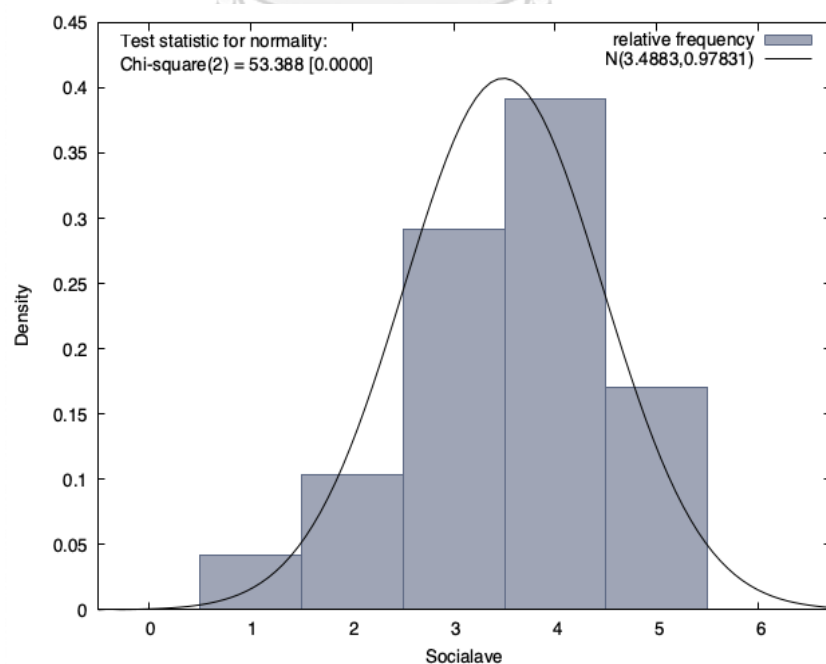
The fifth factor is emotional value toward environmental and animal friendly products containing only 2 required questions to check the level of satisfaction about environmental and animal friendly products. The respondent's answer will be simply calculated for the average score of all respondents. Results of this factor show people feel pretty high satisfied when purchasing environmental and animal friendly products with a mean up to 4.01 and a median of 4. Similar to figure 12, figure 14 has high distribution to agree and strongly agree of having satisfaction when purchasing environmental and animal friendly products up to around 40% in each answer. The fifth factor of emotional value toward environmental and animal friendly products is being tested for normality and the result shows that it is a normal distribution. Its p-value is less than 0.05.

Table 6 Data summary of emotional value toward environmental and animal friendly products.

Factor	Mean	Median	S.D.	Max	Min
Emotional value toward environmental and animal friendly products	4.0136	4	0.79298	5	1

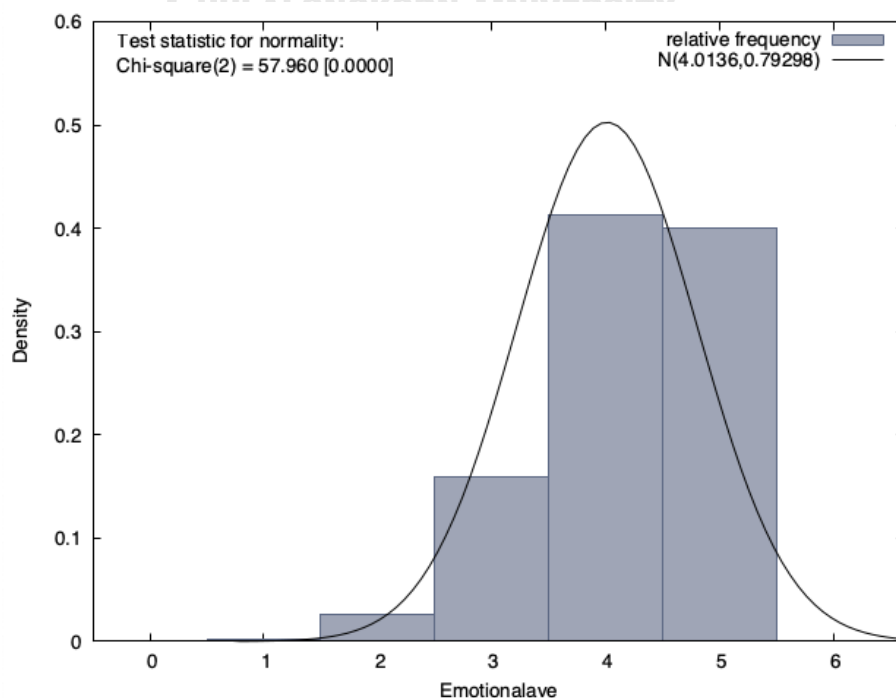Figure 14. Emotional value toward environmental and animal friendly products normality distribution graph

The sixth factor is about motivation and willingness to purchase environmental and animal friendly products. This factor is a little different from the previous factors. it contains 4 questions including 3 Likert scale questions and 1 choice question. An average score of each respondent comes from answers to show the level of motivation and willingness to purchase environmental and animal friendly products and score from estimating the amount of environmental and animal friendly products the respondent wants to purchase in the near future or next month. Having a high number of estimations to purchase environmental and animal friendly products lead to a high score of motivation and willingness to purchase environmental and animal friendly products. the mean of overall respondents is 3.77 with a median of 3.75 (Table 7.) Considering the graph (Figure 15.), it is clearly seen, up to approximately 50% of all respondent's answers agree on having motivation and willingness to purchase environmental and animal friendly products. Also, data of motivation and willingness to purchase environmental and animal friendly products result in normal distribution after test and having p-value of lower than 0.05.

Table 7 Data summary of motivation and willingness to purchase environmental and animal friendly products.

Factor	Mean	Median	S.D.	Max	Min
Motivation and willingness to purchase environmental and animal friendly products.	3.7713	3.75	0.71391	5	1

Figure 15. Motivation and willingness to purchase environmental and animal friendly products normality distribution graph
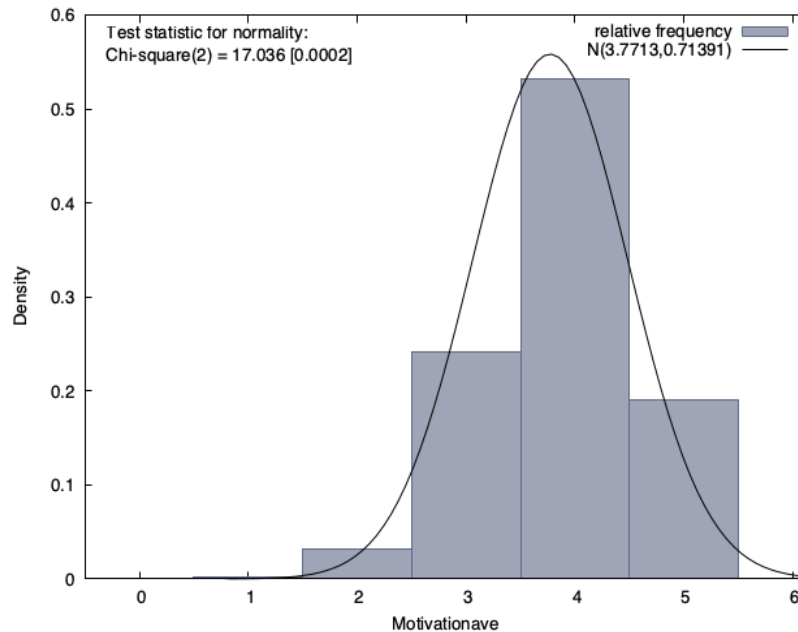
The Last factor for analysis for this paper is the action of purchasing environmental and animal friendly products. This factor consists of many questions. It has 7 questions with this factor. Out of 7 questions, there is 5 Likert scale question, 1 open question, and 1 yes/no question. 5 Likert scale questions will be calculated for average and become a score of action of purchasing environmental and animal friendly products of each respondent. For yes/no question is to only answer whether the respondents have ever used or purchased environmental and animal friendly products or not. Also, the open question asked what products all respondents have experience of using. The data summary of this factor is mean of 3.34 and quite a similar number median of 3.4. (Table 8.) The normality distribution graph for this factor is in a very good bell shape. The majority of respondents answer Neither agree nor disagree and agreed on their action of purchasing environmental and animal friendly products. (Figure 16.) Total data of the last factor is also being tested for normality. The result is similar to all previous factors in that it is normally distributed and has a p-value lower than 0.05.

Table 8. Data summary of the action of purchasing environmental and animal friendly products.

Factor	Mean	Median	S.D.	Max	Min
The action of purchasing environmental and animal friendly products.	3.3385	3.4	0.85302	5	1

Figure 16. The action of purchasing environmental and animal friendly products normality distribution graph
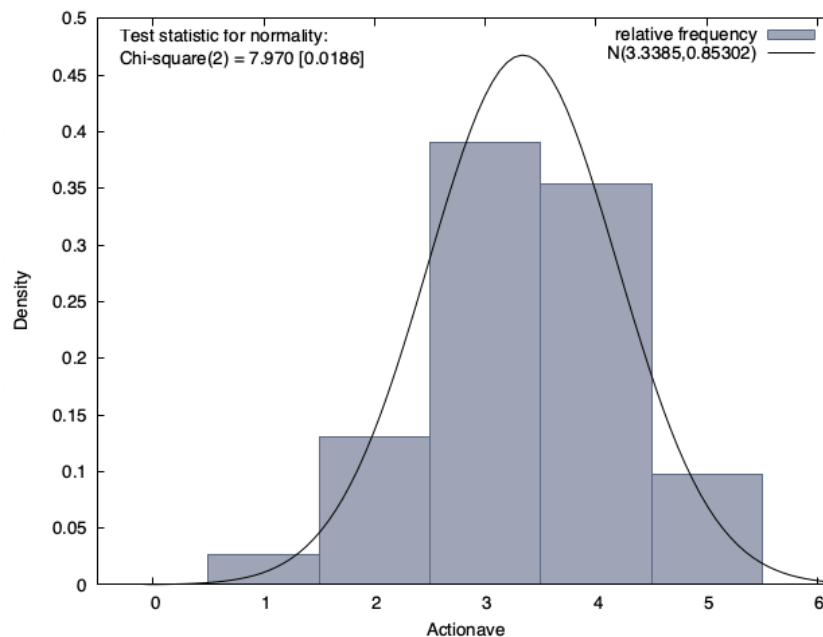
From the overall 7 factors above, the score in each factor for every respondent will be used for further analysis to answer this paper's research questions.

6. Result

There are 2 hypotheses tested in this paper. The test will be divided into 2 parts. Part one is for the first Hypothesis or there are some factors that lead to motivation and willingness to purchase environmental and animal friendly products. (see hypothesis in Table1.) And part two for the second hypothesis or motivation and willingness to purchase environmental and animal friendly products lead to an actual buying action (see hypothesis in Table1.)

6.1 Data Analysis for part 1

For part one, 5 factors from the survey include eco-literacy, environmental and animal concern, attitudes, society belief, and emotional value will be testing out the correlation with the factor of motivation and willingness to purchase environmental and animal friendly products by using multiple linear regression. The result will provide whether which factor(s) lead to motivation and willingness to purchase environmental and animal friendly products and which factor leads to the most of it.

According to Tranmer and Elliot (2008), linear regression will help to test the relationships between response variable Y and single explanatory variable X or more than one variable X. (Tranmer and Elliot 2008) This model is the best suit to explain the relations of eco-literacy, environmental and animal concern, attitudes, society belief, emotional value compared against with motivation and willingness to purchase environmental and animal friendly products because all factors are in quantitative data from Likert scale survey questions.

Results of this model will provide coefficient or level of impact to every 5 factors toward the level of motivation and willingness to purchase environmental and animal friendly products. Additionally, the model result will be able to form an equation for relations as below;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n X_n + \varepsilon$$

6.2 Analysis result of part 1

The results from multiple linear regression with heteroskedasticity corrected 5 possible factors against motivation and willingness to purchase display in Table 9. There are 4 factors out of 5 factors that are statistically significant. When considering a p-value less than 5%, there is a social belief factor that is significant positive correlation. And when considering a p-value less than 1%, there are surprisingly 3 factors that are statistically significant positive correlations which are environmental and animal concerns, attitudes, and emotional value. However, there is one factor that has no relation or is not significant with motivation and willingness of purchasing which is eco-literacy and knowledge. It interprets that having knowledge about environmental

and animal friendly products doesn't lead to more motivation and willingness to purchase environmental and animal friendly products at all.

Considering factors that influence the dependent variable, environmental and animal concerns have a level of coefficient of 0.298 or almost 30%. It can be interpreted that as people start to have one more unit of environmental and animal concerns, they will tend to have a 30% increase to their level of motivation and willingness to purchase environmental and animal friendly products. (Table 9.)

For the factor of attitudes toward environmental and animal friendly products, the result shows a 0.262 or 26% coefficient. It means when people have a more positive unit of attitude toward environmental and animal friendly products, it will lead to around 26% increase in motivation and willingness to purchase environmental and animal-friendly products. (Table 9.)

Social belief has 0.057 or approximately only 6% coefficient result from this model. To interpret, when having more units of positive social belief toward environmental and animal friendly products, people will tend to have 6% more in their level of motivation and willingness to purchase environmental and animal friendly products. (Table 9.)

Lastly, emotional value results to have a 0.244 or 24% coefficient which means when people feel a unit more satisfaction when purchasing environmental and animal friendly products, they will have 24% more motivation and willingness to purchase these products. (Table 9.)

To conclude this model, all results can be formed an equation as below ;

$$\text{MOTIVATION} = 0.14 + 0.298\ \text{CONCERNS} + 0.262\ \text{ATTITUDES} + 0.057\ \text{SOCIALBELIEF} + 0.244\ \text{EMOTIONALVALUE} \qquad \textcircled{1}$$

Table 9. Multiple regression of motivation and willingness to purchase environmental and animal friendly products against 5 factors. (Appendix1.)

Independent variables	Coefficient	Standard error	T-ratio	P-value
Constant	0.144888	0.118850	1.219	0.2233
Eco-literacy and knowledge	0.0386068	0.0283881	1.360	0.1743
Environmental animal concerns	0.297627	0.0451945	6.585	9.67e-11 ***
Attitudes	0.262722	0.0392557	6.693	4.91e-11 ***
Society belief	0.0570457	0.0267868	2.130	0.0336 **
Emotional value	0.244752	0.0362043	6.760	3.18e-11 ***

Dependent variable: motivation and willingness to purchase environmental and animal friendly products

**p-value < 0.05 and ***p-value < 0.001.

In order to check whether this model assumption in this first hypothesis is valid and fit to the model is to test out the normality of residual as well. The result shows that the p-value is 0.06632 or does not reject the null hypothesis in which the null hypothesis is normally distributed. The graph of residuals is normal and in bell shape (Figure 17.) and when put in the plot graph, the residuals do not expand (Figure 18.) as below. (Appendix 3,4)
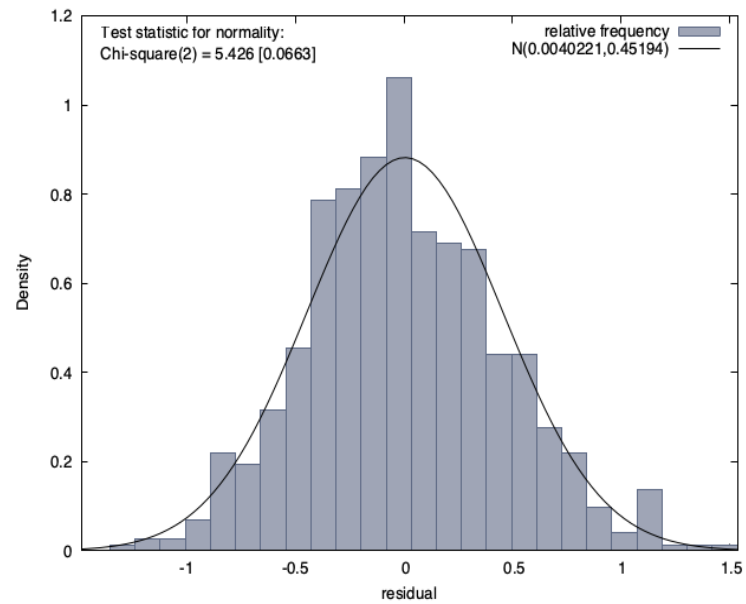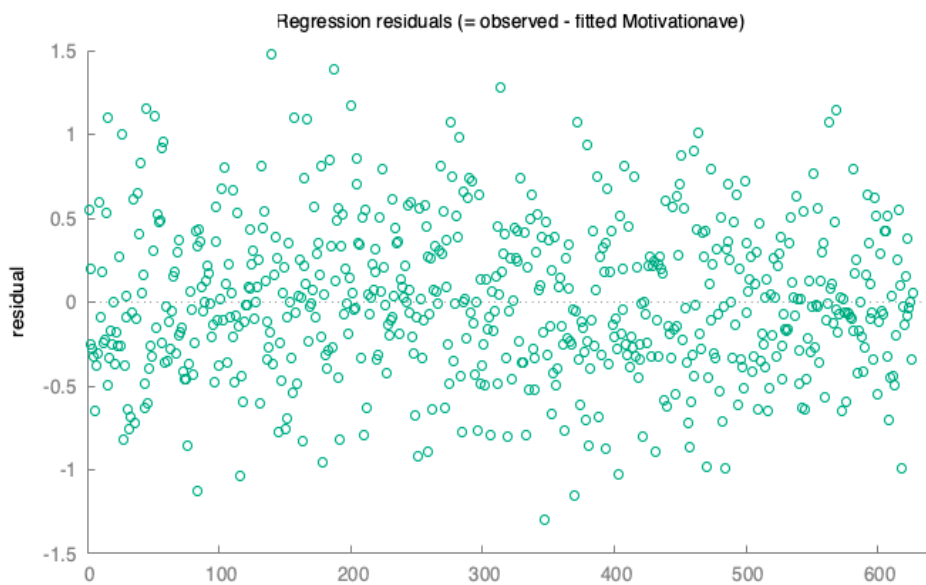
Figure 17. Normality of residuals graph

Figure 18. Normality of residuals plot graph for the first hypothesis model

6.3 Data Analysis for part 2

For the second part of this paper hypothesis testing, according to Ajzen and Fishbein (1980) and Cheah & Phau (2011), the action of purchasing environmental and animal friendly products comes from the intention of each individual so, it is reasonable to test whether motivation leads to the actual action of purchasing or not. It may occur that people with motivation and willingness to purchase might not end up actually purchasing it in the future or even have never purchased it in the past. The test results will answer this question and the best model used to answer this hypothesis is two-state least-squared.

Two-state least-squared is the best suitable model for this hypothesis testing. This model will be able to answer response variable Y which is the motivation and willingness to purchase environmental and animal friendly products and single explanatory variable X which is the action of purchasing environmental and animal friendly products. However, motivation has relations with 4 factors from the previous analysis, eco-literacy, environmental and animal concern, attitudes, society belief, and emotional value. So these 4 factors will be instruments for this model. To sum up, the variable used in this model will be, dependent variable Y as the action of purchasing, independent variable X as motivation and willingness of purchasing, and instrument variables as 4 significant factors from the previous model test result. (see Table 9.)

The result of this model will provide coefficient or relations between the action of purchasing and motivation and willingness of purchasing environmental and animal friendly products when considering the previous 4 significant factors related to motivation and willingness of purchasing. Additionally, the model result will be able to form an equation for relations as below;

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

6.4 Analysis result of part 2

The result of the two-state least-square model of motivation and willingness to purchase environmental and animal friendly products against the action of purchasing it when having 4 instrument variables, environmental and animal concern, attitudes, society belief, and emotional value, is displayed in Table 9.

Motivation and willingness of purchasing environmental and animal friendly products are statistically significant on the action of purchasing it. when having a unit more motivation and willingness to purchase, will lead to 0.99 or 99% of actual purchase actions in the statistical analysis model. It is almost definite that having motivation and willingness to purchase it will lead to action of purchasing positively increase in a quite similar level. to conclude, the equation of this second analysis is as below;

$$ACTION = -0.41 + 0.99 \ MOTIVATION \qquad \textcircled{2}$$

Table 10. Two-state least-squared of the action of purchasing environmental and animal friendly products against motivation and willingness to purchase with 4 instruments

Independent variables	Coefficient	Standard error	T-ratio	P-value
Constant	−0.408382	0.169771	−2.405	0.0164 **
Motivation and willingness of purchasing	0.993539	0.0445396	22.31	1.57e-81 ***

Dependent variable: The action of purchasing environmental and animal friendly products.

Instrument variable: Environmental concern, attitudes, society belief, and emotional value.

***p-value < 0.001.

Similarly for heteroskedasticity checking, the p-value of this model result is 0.642 which means not rejecting the null hypothesis. In this case, the null hypothesis is homoscedasticity. (Appendix 4.) As well as, the residual plot is consistent and does not expand. (Figure 19.)

Figure 19. Normality of residuals plot graph for the second hypothesis model
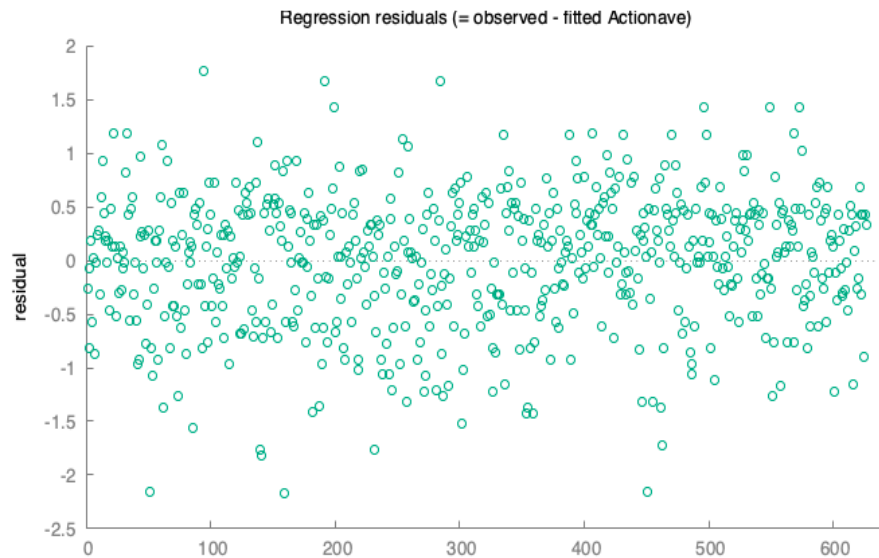
7. Conclusion and discussion

From the first hypothesis testing model above, there are some factors that lead to motivation and willingness to purchase environmental and animal friendly products. Out of the 5 factors that we put into this analysis, there are up to 4 factors that are statistically significant that lead to motivation and willingness to buy environmental and animal friendly products. Those 4 factors include environmental and animal concern, attitudes, society belief, and emotional value toward environmental and animal friendly products. It means that having environmental and animal concerns, attitudes, society beliefs, or emotional value toward environmental and animal friendly products will lead to a higher level of motivation and willingness to purchase those products at a different level depending on each factor.

However, there is one factor that was not leading to more motivation and willingness to purchase environmental and animal friendly products. It was eco-literacy and knowledge about environmental and animal friendly products. It can be interpreted that having lots of knowledge about environmental and animal friendly products does not make that person want to purchase more environmental and animal friendly products when compared with other previous 4 factors.

Considering the second hypothesis model, motivation and willingness to purchase environmental and animal friendly products definitely lead to action of purchasing it

when motivation has relation to environmental and animal concerns, attitudes, society beliefs, or emotional value or first 4 statistical significant factors. The high motivation and willingness people in Thailand have been purchase environmental and animal friendly products and going to continue buying those products in the future

For other activists who are interested in changing people to buy environmental and animal friendly products instead of other convenience products, they should pay attention to pull up 4 factors above in order to make people have more of motivation and willingness to purchase and at the end leading to the actual action of purchasing environmental and animal friendly products.

For business activities that are interested in environmental and animal friendly product lines, customers that will have good sales are those with environmental and animal concerns, attitudes, society beliefs, or emotional value about environmental and animal friendly products because those target customers will have a higher chance of purchasing actions.

8. Limitations and future research

There are some holes that this paper still did not cover. Firstly, it concluded only 5 factors in the first hypothesis testing of motivation and willingness of purchasing environmental and animal friendly products which it might be too narrowed for factors that lead to motivation and willingness. There are lots more than just these 5 factors above. According to Lin & Huang (2011), not only knowledge and emotional values, but they also include prices and quality, product condition, and promotions that will determine the decision making as well (Lin and Huang 2012). In future research, it would be better to extend to more factors in many more aspects of environmental and animal-friendly products. Similarly, there will be more reasons and factors that make people decide to buy environmental and animal friendly products instead of other common products, not only motivation and willingness.

Next researcher can start to survey and interview factors and reasons for buying environmental and animal friendly products and will receive more factors for future analysis. Moreover, environmental and animal concerns have been an issue for decades (Lund, Coleman, Gunnarsson, Appleby, Karkinen, 2006), there is more than enough previous research existing for exploration. A combination of this paper

and other papers will allow you to generate and expand the reasons behind environmental and animal friendly products furthermore.

APPENDIX

Appendix 1. Total characteristic of Sample

Characteristics	Answers	Sample Size (628)	Frequency Distribution
Age	Below 18	0	0
	18-29 years old	175	28%
	30-49 years old	284	45%
	50-64 years old	149	24%
	Over 65 years old	22	3%
Gender	Male	172	27%
	Female	450	72%
	Other	8	1%
Education	Less than high school	7	1%
	High school graduation	32	5%
	Undergraduate degree	194	31%
	Graduate degree or higher	397	63%
Employment Status	Unemployed	54	9%
	Private employed	130	21%
	Public employed	341	54%
	Self-employed	65	10%
	Retired	40	6%
Income	Less than 15,000 THB per month	47	7%
	15,001 - 25,000 THB per month	152	24%
	25,001 - 35,000 THB per month	167	27%
	35,001 - 45,000 THB per month	121	19%
	45,001 - 55,000 THB per month	61	10%
	55,001 - 65,000 THB per month	39	6%
	Over 65,000 THB per month	43	7%

Marital Status	Single	350	56%
	Married	246	39%
	Widowed	19	3%
	Divorced	15	2%
Child	Don't have child	376	60%
	Having 1 child	105	17%
	Having 2 children	118	19%
	Having 3 children	28	3.6%
	Having more than 4 children	3	0.4%
Have ever used environment and animal friendly product before	Yes	568	90%
	No	62	10%

Appendix 2. First part of survey question: 7 Factors for analysis

1. **Eco-literacy and knowledge about environmental and animal friendly products.**

The first factor concludes with 4 Likert scale questions to have respondents self score themselves about whether they consider themselves with the knowledge or had searched to know more on environmental and animal friendly products in general. Those 4 questions for this factor are as below;

(1.1) I always research and gather information about environmental and animal friendly products.

(1.2) I generally have knowledge about environmental and animal friendly products.

(1.3) I always check on labels for friendly product signs before purchasing.

(1.4) I know product brands that are less harmful or friendly toward the environment and animals.

2. **Environmental and animal concerns**

The second factor of this paper is about the level of concern for overall animals and the environment of each respondent, not specific to just environmental and animal friendly products. All question covers the decision of buying products in respondents' daily life to doing donation or charity for both environments and animal welfare. It concludes with 5 Likert scale questions for respondents' self scores. Those 5 questions for this factor are as below;

(2.1) I would like to switch to buying friendly products because of my concern toward the environment and animals.

(2.2) When I have 2 options of products, I will decide to buy less harmful or friendly products.

(2.3) I avoid buying some products when I know they are harmful to the environment or/and animals.

(2.4) I donate to charity about environmental or/and animal protection.

(2.5) Before purchasing, I searched for information about how the product was made and after use conditions whether it will affect the environment and animals in the future.

3. **Respondents' attitudes toward environmental and animal friendly products**

This factor narrows down to only about environmental and animal friendly products. It contains 5 Likert scale questions for respondents' self score. These questions will get to know respondent opinion and thoughts about environmental and animal friendly products in general from price, quality, and impact on the world. All 5 questions are listed as below;

(3.1) I think environmental and animal friendly products have a better quality worth purchasing.

(3.2) I think environmental and animal friendly products have reasonable prices worth purchasing.

(3.3) I believe major changes to improve the environment and animal condition come from friendly products.

(3.4) I think buying environmental and animal friendly products will help to preserve our world.

(3.5) I think purchasing environmental and animal friendly products is a significant factor to help preserve the environment and animals.

4. **Social Belief toward environmental and animal friendly products**

The fourth factor will ask about people around respondents and their social belief about environmental and animal friendly products. It contains up to 6 Likert scale questions and covers 2 groups of people which are respondents' families and relatives, and Respondents' friends and colleagues. Questions will be quite similar to questions asking about our respondents themselves but for this factor asking about others instead. These 6 questions are listed below;

(4.1) My family and/or relatives always choose to buy environmental and animal friendly products instead of non environmental and animal friendly products.
(4.2) My Family and/or relatives always tell me to choose environmental and animal friendly products instead of non environmental and animal friendly products.
(4.3) My Family and/or relatives always research about environmental and animal friendly products and the effect of each product after use.
(4.4) My friends or colleagues always choose to buy environmental and animal friendly products instead of non environmental and animal friendly products.
(4.5) My friends and/or colleagues always tell me to choose environmental and animal friendly products instead of non environmental and animal friendly products.
(4.6) My friends and/or colleagues always research about environmental and animal friendly products and the effect of each product after use.

5. **Emotional value toward environmental and animal friendly products**

This factor of emotion from respondents when purchasing environmental and animal friendly products has only 2 Likert scale questions. It asks about respondent feelings and satisfaction levels when purchasing environmental and animal friendly products. Both 2 questions are as below;

(5.1) Decision to purchase environmental and animal friendly products makes instead of convenience products I feel satisfied.
(5.2) Buying convenience products or non-friendly products makes me feel I am doing unethical practices.

6. **Motivation and willingness to purchase environmental and animal friendly products**

This factor contain 4 questions both Likert scale for 3 questions and choices question. Likert scale questions will ask respondents to self score themselves about their level of desire to buy environmental and animal friendly products. Also, choices question asking an approximate number of environmental and animal friendly products they want to buy. It helps to check the number of products they want to buy and it can be easily converted for quantitative numbers for further analysis in this paper as well. All questions are listed below;

(6.1) I want to buy environmental and animal friendly products.

(6.2) I want to choose to buy environmental and animal friendly products instead of nonenvironmental and animal friendly products.

(6.3) I am willing to pay extra money to choose environmental and animal friendly products.

(6.4) In approximate, how many friendly products will I buy in the next month?

7. **The action of purchasing environmental and animal friendly products**

The Last factor for analysis in this model is about the level of the actual action of purchasing environmental and animal friendly products. It has up to 7 questions which are 1 yes/no question, 1 open question, and 5 Likert scale questions. Yes/no questions will give us a very clear proportion percentage from overall respondents that in what percentage have or haven't used environmental and animal friendly products. The only 1 open question is to gather information on what product they have ever used and also be able to recognize that product(s) to answer for this open question. lastly, 5 Likert scale questions asking the respondents past experiences of using environmental and animal friendly products along with definite plans to buy environmental and animal friendly products for their daily use as well. Those 7 questions are as below;

(7.1) Have ever used environmental and animal friendly products (yes/no)

(7.2) I bought environmental and animal friendly products recently.

(7.3) environment and animal friendly product I recently use (opened question)

(7.4) I decided to buy environmental and animal friendly products instead of non environmental and animal friendly products from now on.

(7.5) How many friendly products have I bought in the past month?

(7.6) I paid extra money to choose environmental and animal friendly products recently.

(7.7) I intend to pay more for friendly products in the near future.

Appendix 3. The second part of the survey question: General demographic information.

Age

- Below 18
- 18-29 years old
- 30-49 years old
- 50-64 years old
- Over 65 years old

Gender

- Male
- Female
- Other

Education

- Less than high school
- High school graduation
- Undergraduate degree
- Graduate degree or higher

Employment status

- Unemployed
- Private employed
- Public employed
- self-employed
- Retired

Income

- Less than 15,000 THB per month
- 15,001 - 25,000 THB per month

- 25,001 - 35,000 THB per month
- 35,001 - 45,000 THB per month
- 45,001 - 55,000 THB per month
- 55,001 - 65,000 THB per month
- Over 65,000 THB per month

Marital status

- Single
- Married
- Widowed
- Divorced

Child

- Don't have a child
- Having 1 child
- Having 2 children
- Having 3 children

Having 4 or more children

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Appendix 4. Multiple linear regression with heteroskedasticity corrected for first hypothesis

```
Model 1: Heteroskedasticity-corrected, using observations 1-627
Dependent variable: Motivationave

                  coefficient   std. error   t-ratio   p-value
   -----------------------------------------------------------------
   const           0.144888      0.118850     1.219     0.2233
   Ecoliteracyave  0.0386068     0.0283881    1.360     0.1743
   Concernave      0.297627      0.0451945    6.585     9.67e-11  ***
   Attitudeave     0.262722      0.0392557    6.693     4.91e-11  ***
   Socialave       0.0570457     0.0267868    2.130     0.0336    **
   Emotionalave    0.244752      0.0362043    6.760     3.18e-11  ***

Statistics based on the weighted data:

Sum squared resid    2485.483   S.E. of regression    2.000597
R-squared            0.626517   Adjusted R-squared    0.623510
F(5, 621)            208.3450   P-value(F)            3.2e-130
Log-likelihood      -1321.450   Akaike criterion      2654.901
Schwarz criterion    2681.547   Hannan-Quinn          2665.253

Statistics based on the original data:

Mean dependent var   3.771265   S.D. dependent var    0.713908
Sum squared resid    126.8503   S.E. of regression    0.451960

Excluding the constant, p-value was highest for variable 1 (Ecoliteracyave)

Test for normality of residual -
  Null hypothesis: error is normally distributed
  Test statistic: Chi-square(2) = 5.42647
  with p-value = 0.0663219
```

Appendix 5. Normality of residual test for first hypothesis model

```
Frequency distribution for residual, obs 1-627
number of bins = 25, mean = 0.00402208, sd = 0.451942

        interval          midpt    frequency    rel.      cum.

            < -1.2391    -1.2969        1       0.16%     0.16%
  -1.2391 - -1.1234      -1.1813        2       0.32%     0.48%
  -1.1234 - -1.0078      -1.0656        2       0.32%     0.80%
  -1.0078 - -0.89216     -0.94998       5       0.80%     1.59%
  -0.89216 - -0.77652    -0.83434      16       2.55%     4.15%
  -0.77652 - -0.66088    -0.71870      14       2.23%     6.38%
  -0.66088 - -0.54525    -0.60306      23       3.67%    10.05%  *
  -0.54525 - -0.42961    -0.48743      33       5.26%    15.31%  *
  -0.42961 - -0.31397    -0.37179      57       9.09%    24.40%  ***
  -0.31397 - -0.19833    -0.25615      59       9.41%    33.81%  ***
  -0.19833 - -0.082692   -0.14051      64      10.21%    44.02%  ***
  -0.082692 -  0.032947  -0.024873     77      12.28%    56.30%  ****
   0.032947 -  0.14859    0.090766     52       8.29%    64.59%  **
   0.14859 -  0.26422     0.20640      50       7.97%    72.57%  **
   0.26422 -  0.37986     0.32204      49       7.81%    80.38%  **
   0.37986 -  0.49550     0.43768      32       5.10%    85.49%  *
   0.49550 -  0.61114     0.55332      32       5.10%    90.59%  *
   0.61114 -  0.72678     0.66896      20       3.19%    93.78%  *
   0.72678 -  0.84242     0.78460      16       2.55%    96.33%
   0.84242 -  0.95805     0.90023       7       1.12%    97.45%
   0.95805 -  1.0737      1.0159        3       0.48%    97.93%
   1.0737 -  1.1893       1.1315       10       1.59%    99.52%
   1.1893 -  1.3050       1.2471        1       0.16%    99.68%
   1.3050 -  1.4206       1.3628        1       0.16%    99.84%
        >=  1.4206        1.4784        1       0.16%   100.00%

Test for null hypothesis of normal distribution:
Chi-square(2) = 5.426 with p-value 0.06632
```

Appendix 6. Two-stage least-squares model for second hypothesis

```
Model 2: TSLS, using observations 1-627
Dependent variable: Actionave
Instrumented: Motivationave
Instruments: const Concernave Attitudeave Socialave Emotionalave


                     coefficient   std. error   t-ratio   p-value
       ------------------------------------------------------------------
       const           -0.408382    0.169771     -2.405    0.0164   **
       Motivationave    0.993539    0.0445396     22.31    1.57e-81 ***

Mean dependent var    3.338517    S.D. dependent var   0.853023
Sum squared resid     238.3268    S.E. of regression   0.617514
R-squared             0.493443    Adjusted R-squared   0.492632
Chi-square(1)         497.5967    p-value              3.2e-110
```

Appendix 6. Pesaran-Taylor test for heteroskedasticity on second model hypothesis

```
Pesaran-Taylor test for heteroskedasticity
OLS, using observations 1-627
Dependent variable: uhat^2

                 coefficient   std. error   t-ratio   p-value
   ------------------------------------------------------------------
   const          0.344829      0.0795960    4.332    1.72e-05 ***
   yhat^2         0.00307654    0.00662031   0.4647   0.6423

   Unadjusted R-squared = 0.000345

Test statistic: HET_1 = |0.003077| / 0.006620 = 0.464712,
with p-value = 2 * P(z > 0.464712) = 0.642
```

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