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ON THE FACTORS INFLUENCING TAIWANESE INVESTORS' PURCHASE OF GREEN FUNDS-WITH ENVIRONMENTAL RESPONSIBILITY AS THE MODERATOR VARIABLE

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Abstract

Countries all over the world have suffered major disasters and losses from global climate and environmental anomalies, among which Taiwan is in the high risk group of climate change. In the past century, Taiwan's average temperature has increased by 1. 3℃, twice of the global average value, which should draw more attention to environmental protection. Evidences already show that human behaviors are the major factor for the acceleration of global warming. In view of this, Stern and Gardner (1996) proposed to improve the value, attitude and behaviors of the public through environmental education. This research aims to adopt behavioral theory combined with environmental responsibility, perceived price and environmental value to construct a behavior model that may affect the investors' purchase of green funds, so as to encourage more investors to purchase green funds that are beneficial for environmental protection and development of green technology. A total of 281 valid questionnaires were collected and analyzed with structural equation modeling method. The analysis results show that perception, behavioral control and attitude will have a positive influence on investors' willingness to purchase green funds, while environmental responsibility positively reinforces such correlation; perceived price, on the other hand, have negative influence on the attitude. This research also discusses the aforementioned results and then provide suggestions.

Keywords: Green funds, planned behavior theory, environmental responsibility, environmental value, perceived price

Introduction

Intergovernmental Panel on Climate Change (IPCC) indicated that the density of major CO^2, CH^4, N^2O and other greenhouse gases in earth atmosphere in 2006 was 35. 4%, 154. 7% and 18. 2% higher respectively than that before the age of industrialization. The continuously rapid increase of density of greenhouse gases has led to the unusual global warming, which further caused the abnormality of global climate and environment.

The density of global greenhouse gases now has reached430ppm (the normal level is below 400ppm). Even if governments actively take actions to reduce greenhouse gases, there is still a high probability for the global temperature to increase 2~3℃ (Stern, 2000). UN reports pointed out that Taiwan is in the high risk group of climate change and in the past century, Taiwan's average temperature has increased by 1. 3℃, which is about twice of the global average value and higher than its neighboring Japan and Mainland China. Gore (2007) pointed out in his *An Inconvenient Truth* that human behaviors are the major factor for the acceleration of global warming. Excessive emission of greenhouse gases, excessive energy consumption for urban construction and production of excessive garbage, rainforest deforestation and other excessive consumption and non- environmental- friendly behaviors all contributed to the acceleration of global warming. Therefore, if we can make more environmental friendly behaviors and change the high-energy consumption and high-consumption living style, it will relieve and even reduce the risks caused by global warming.

The current growing mode of economy will only consume more natural resources and lead to more difficult situations. In fact, the water, air and other natural resources on the earth are limited. Economic development with no limit and restriction will cause the exhaustion of natural resources. Examples of related scholar comments and theories are as below: as early as 1798, Malthus had noticed the phenomenon that the agricultural land was limited but the popular kept increasing, from which, he predicted that human being will face the threat of famine and the economic growth will become stagnate; in his research report The Limits to Growth, Club of Rome strongly criticized that if the current mode of economic development continued, it would lead to shortage of natural resources. Club of Rome further proposed that in order to avoid disastrous consequences and relieve the currently speed of energy consumption, we can start with maintaining a stable birth rate and output rate. In his book Silent Spring, Rachel Carson described the scene of environmental damages

caused by excessive use of pesticides for maximum cultivation of crops. American economist K. E. Boulding (1966) put forward the idea of "spaceship economy", which said that the earth is like a spaceship sailing in the unknown universe. The air, water, food and other resources in the spaceship are all limited but the population and economy keep growing, which will cause the exhaustion of resources and the wasted produced during the production and consumption process of human being will also pollute the spaceship. In the end, human being will become the victim of its own deeds. Paul. Ehrlich's theory of "population explosion" believed that if population growth is not controlled, in about 900 year, the land surface of the earth will be crowded with 100 persons per square meters and at that time, the earth will be overcrowded. Past historic records already told us that the long ignorance of the relationship between human and environment would cause extinction of ethnic groups. For example, on the Easter Island, because of population growth and then the land exploitation and overcutting, the resources were exhausted and famine and wars were caused; Mesopotamia suffered ethnic extinction because they cannot properly use and maintain the artificial irrigation system including rivers; ancient Indian civilization's agricultural foundation because the urban construction and excessive grazing caused deforestation and indirectly caused the drying and salinity of land, which lead to the decrease of arable land". All these examples have proved the influence of environmental conservation on the survival of human being.

Stern (2009) proposed to improve the value, attitude and behaviors of the public through environmental education. More active practice is to start with beforehand prevention, i. e. , to arouse the public awareness toward environment and their caring for the environment. With the global warming and frequent happening of natural disasters, more and more investors are willing to invest in green funds to contribute to environmental protection. Green funds refers to special investment fund targeting energy saving and emission reduction strategy, low-carbon economic development, environmental improvement projects with the aim to foster the development of energy saving and emission reduction through capital investment. The motive of this research is to the behavior model to predict the investors' purchase of green funds. The theoretical basis is Ajzen's theory of planned behaviors, while the environmental responsibility will be the moderator variable. The purpose is to clarify the factors that may encourage investors to buy green funds and to work out advises to encourage the investors to do so as a contribution to

environmental protection. On the other hand, purchase of green funds will allow companies contributive to environmental protection to acquire funds, encourage consumers not to consider solely the profitability while buying funds, but to evaluate their investment targets more at the standpoint of global environmental protection and future development of human kind.

Literature Review

(1) Ajzen's Theory Of Planned Behavior (TPB)

The theory of planned behavior (TPB) was proposed by Ajzen (1988-1991) , which, together with its predecessor "theory of reasoned action" (TRA; Fishbein & Ajzen, 1980) , was widely applied psychological theory. Both TPB and TRA were applied to various behavioral researches, including in some researches with Taiwan people as samples (e. g. Wang, 2003; Lam and Wu, 2008; Lam, 2006; Lam & Chen, 2006). Behavior willingness is a kind of cognitive activity that reflect an individual's willingness and conscious plans for certain behavior and is an indicator for behavior predication. Ajzen also noted that there is a very high relevance between behavior willingness and the behavior, and thus the behavior willingness (BI) can be virtually considered directly as a behavior. BI is decided by the attitude toward the behavior and the subjective norm, while TPB considers also the perceived behavior control. TPB predicts that the more positive attitude a person holds toward a behavior, the higher pressure he will feel from the circumstances; the more behavioral control he perceives, the greater willingness he will have for such behavior.

In terms of attitude, it is an important variable for prediction of environmental behaviors. Hines, Hungerford, and Tomera (1986) found a positive correlation between behavioral attitude and environmental protection behaviors. Hwang, Kim, and Jeng (2000) revalidated the model proposed by Hines et al. , and found that the behavioral attitude imposes a strong influence on the willingness of environmental protection behaviors. Cheng (2004) interviewed 210 environmental community members, and found that attitude is the major variable affecting behavioral willingness in three behavioral models (i. e. , joint signature, policy lobbying and ecological interpretation). Therefore, this variable shall be especially incorporated into the prediction of behavioral willingness. Furthermore, Hartmann & Apaolaza-Ibanez (2008) made a broad definition of environmental attitude, thinking that cognition, emotion, behavioral willingness and even the components of knowledge and value are included in the broad value.

In this research, the concept of

"subjective norm" is limited to normative influence while information influence is only considered as a constituent of "attitude". When someone accepts others opinions because he agrees with such opinions, or because he considers the information provided by others has reference value, then the influence he receives is a kind of "information influence". However, if he accepts others' opinions because he considers others' feelings (for example, his family will agree) or their evaluation on himself, then the influence he receives is a kind of "normative influence". Therefore, this research considers the "opinions of professionals" as information influence, while "family, financial peers" as normative influence

In terms of perceived behavioral control, Ajzen (1988, 1991) thought that perceived behavioral control reflects someone's previous experiences and predicted obstacles. The more resources and opportunities one thinks he has, the fewer obstacles he will perceive and the greater perceived behavioral control he will have on the behaviors.

(2) Environmental value

The term "new environmental paradigm" (NEP) was created by Dunlap and Van-Liere (1978). It emerged from the deteriorating environmental problems that made people reflect on environment. Dunlap and Van-Liere believed that the mainstream social paradigm at their time showed an anti-biological image, which only considered the need of society itself but excluded human being from the natural world and neglected the influence of environment on the society.

NEP scale attempts to show the environmental attitude. However, the actual positive environmental attitude is more complex than imagined, as there are many factors affecting the environment. In view of this, Dunlap, Van-Liere, Merting, and Jones modified the NEP scale in 2000, with the expectation that the connotation of "new environmental paradigm" can expand the biological view of the world, balance the number of positive and negative questions and avoid it from becoming outdated.

Therefore, Dunlap et al. studied on 676 students in Washington State, evaluating its reliability and validity with statistical analysis. The correlation between each item and the general scale, r =0. 33-0. 62, α =0. 83 (originally 12 items, α=0. 81). The test result got good reliability, while the scale was renamed as "New ecological paradigm" as it is a modification of the" new environmental paradigm" scale. The number of items was increased from 12 to 15. Principal components factors analysis was used to divide the 15-item scale into 5 factors, including: Limits to growth, Anti- anthropocentrism, Balance of nature, Rejection of exemptionalism and Possibil-

ity of an eco- crisis.

(3) Environmental responsibility

Hines et al. (1986) mentioned in the model of responsible environmental behavior that environmental behavior is influenced by behavioral willingness while the latter is influenced by multiple variables, including action skills, knowledge of action strategies and knowledge and attitudes on issues, locus of control and personal responsibility. Hopper and Nielsen (1991) referred in the model of altruistic behavior that altruistic behaviors first appear under the influence of social norms. Only when an individual accepts social norms will he shape his personal norms, i. e. , his personal behavioral standard, according to the social norms. Then when he is aware of the consequences and responsibility belongs, the altruistic behavior will appear. For example, when investors believe that if they continue to keep the current consumption patterns, it will bring serious consequences on the global environment and they must be responsible for such consequences, then they will turn to altruistic behaviors such as purchase of green funds. The responsible environmental behavioral model of Hines et al. (1986) also indicates that responsibility and attitude are considered as personality factors and will influence behavioral willingness together with such variables as skills and knowledge. From the altruistic behavioral model of Hopper and Nielsen (1991) we can also know that responsibility is also an important variable affecting behaviors.

Based on related studies on altruistic theory and sense of responsibility, Lin, Sun, Chiang, and Hsieh (2008) found that responsibility is an important factor affecting the students of nursing department in their willingness to take care of SARS patients. Kaiser, Ranney, Hartig, and Bowler (1999) incorporated sense of responsibility into the rational-choice model and tested the model after including the sense of responsibility by selecting 436 Swiss adults and 488 college students in California as samples.

The study found that the sense of responsibility not only explains the behavioral willingness but also increases 5% and 10% model explanatory power on the aforementioned two samples respectively. Hines et al. (1986) analyzed six related research articles, finding that people with higher sense of responsibility are more likely to make responsible environmental behaviors compared with those with lower sense of responsibility.

Therefore, based on the above literatures and related research collections, this research believes that sense of responsibility is one of the major variables affecting purchase willingness and thus includes sense of responsibility in the behavioral model to predict the investors' purchase of green funds.

(4) Perceived price

Perceived price is the cost that consumers must pay or sacrifice to get products or services, including the price paid with currency and non-currency means (Zeithaml, 1988). For consumers, non-currency expenditures are difficult to measure. This is why the majority researches only focus on the currency cost perceived by consumers (Teas & Agarwal, 2000) , regarding price as the currency that need to be paid for purchase of products or services (Kotler, 1999). The historic researches all confirmed that price is an important factor affecting consumer behaviors for consumers (Huang et al. , 2004) ; perceived price is the most direct feeling of consumers and also an important basis for valuation and purchase decisions (Voss et al. , 1998). This research defines the perceived price as the price actually paid by investors to buy green funds, including the cost and margin for purchase of green funds.

Research Method

(1) Research Structure

To construct the behavioral model that may affect the investors' purchase of green funds, this research adopts planned behavioral theory as the subject with reference to the responsible environmental behavioral model of Hines et al. (1986). It also takes the broader definition of environmental attitude of Hartmann & Apaolaza-Ibanez (2008) , considers perceived price, environmental value as the factors affecting attitude, sense of environmental responsibility as moderator variable to construct the behavior model that can explain investors' purchase of green funds.

(2) Questionnaire design

For the part of environmental value, this research adopts the New Ecological Paradigm scale as the reference for question design to measure the investors' concern for the environment. Such scale was proposed by Dunlap, Van-Liere, Merting, and Jones (2000) , which is widely used to measure the environmental attitude, belief and value. Dunlap, Van-Liere, Merting, and Jones (2000) used the New Ecological Paradigm to make survey on 676 students in Washington State, the result of which showed a high overall reliability at. 83. Moreover, as NEP scale also has a good validity for the measurement of environmental attitude, it draws attention of scholar in the environmental education field and fields of social sciences

About the variables related to the planned behavioral theory, this research designs related questions mainly according to the definitions and ideas of Ajzen (1991) and only considering historic findings to divide the subjective norms to information and normative influences. Thus, this research also considers normative influence in the meas-

urement of subjective norms.

For questions about sense of environmental responsibility, the researcher mainly referred to the studies of Hines et al. (1986) , Kaiser, Ranney, Hartig and Bowler (1999) etc. For the part of perceived price, two questions were designed to ask investors about the price and charges for purchase of green funds with reference to the research questions proposed by Huang et al. , (2004). Besides, to facilitate respondents to fill in the questionnaire, all scales of this research adopted Likert's "five-point scale" (from strongly disagree-1 point to strongly agree5 points) to investigate the respondents' opinions about the variables (Table 1).

(3) Means for collecting respondents

This research cooperated with two financial practitioners in Taiwan and got their consent to interview investors in their premises about their opinions concerning purchase of green funds. The interviewers will only make interview on an investor after confirming that such investor has purchased before or is currently holding green funds. In this research, the term "green fund" refers to the special investment fund established for energy saving and emission reduction strategy, low carbon economic development, environmental improvement projects. The investigation period was from September1, 2018 to November 25, 2018, during which a total of 281 valid questionnaires were acquired.

Research Results

(1) Background data of respondents

A total of 281 respondents participated in this questionnaire survey, the majority of which were male, accounting for 61. 8%; the distribution of age is 51-60 years old (38. 0%) , 41-50 years old (35. 5%) and 31-40 years old (21. 1%) ; in terms of educational background, the majority of respondents have university degrees (38. 0%) , followed by junior college degrees (34. 9%) ; as to monthly disposable income of the family, the majority is NT$ 80, 001~ NT$100, 000 (36. 7%) , followed by above NT$100, 000 (33. 1%) ; 52. 2% of the respondents are still concerned that their current family income is relatively low; 20. 8%respondents have financial background, 31. 9% own 2 funds, followed by those with 2. 1-3 funds (26. 5%) and those with 3. 1-4 funds (24. 7%) ; the top 4 resources where the investors acquire green fund related information are: financial experts (17. 6%) , network (14. 6%) , financial peers (13. 7%) and banking specialists (11. 0%) ; about the length of time for purchase of green funds, 21. 6% respondents have been buying green funds for less than 2 years, 31. 2%respondents for 2-4 year and 35. 1% respondents for

Table 1. References for the measurement method of questionnaire items

Research variable	Definition and measurement method	References
Environmental value	Ask respondents about the opinions about the ecology, resources and environment. Use 15 items to ask respondents' opinions about the environmental and ecological status as well as the influence of human being on the environment	Dunlap, Van-Liere, Merting, and Jones (2000)
Perceived price	This research designed two items to ask investors about the price and charges for purchase of green funds	Huang et al. , (2004)
attitude	Ask investors whether it is good or bad to buy green funds and whether they shall buy it. There are five items to ask the respondent whether he feels meaningful and happy to buy green funds, whether it is helpful for environmental protection, whether it is a conscience course etc.	Ajzen (1991)
Information influence	Ask the respondent the extent to which he thinks the information provided by others has reference value to listen to. There are two items to test the extent to which the respondent refers to opinions of stock expert and internet financial experts.	Ajzen (1991)
Normative influence	Ask the respondent the extent to which he considers to listen to the feelings and opinions of important subject. There are two items to test the extent to which the interview emphasizes his family and financial peers.	Ajzen (1991)
Perceived behavioral control	Ask the respondent's subjective belief about the degree of difficulty or feasibility for the purchase of green funds. There are 4 items to ask the respondent whether he masters or know about the profitability of green funds, the content of fund investment, the price of the funds and degree of convenience for purchase.	Ajzen (1991)
Sense of responsibility	Ask the respondent about his opinion about environmental and ecological responsibility. There are 3 items to ask the interview' s opinion about his responsibility, as someone concerned about environmental issues, for environmental ecology, reduction of exces-	Hines et al. (1986) , Kaiser, Ranney, Hartig, and Bowler (1999)

Research variable	Definition and measurement method	References
	sive waste as well as environment	
Purchase willingness	Ask about the respondent's willingness for purchase of green fund. There are 2 items to ask about the respondent's willingness to buy green funds in the coming 6 months.	Ajzen (1991)

Table 2. Structural Model Appropriateness Table

Model Indicator	Purchasing Green Funds	Critical value of indicator
RMSEA	. 021	<0. 05
GFI	. 956	>0. 90
AGFI	. 782	>0. 90
NFI	. 988	>0. 90
RFI	. 971	>0. 90
CFI	. 952	>0. 90
IFI	. 979	>0. 90
TLI	. 689	>0. 90

over 5 years; 66. 9% of the respondents answered affirmatively that purchasing green funds are helpful for promoting environmental protection in the world, while 20% of the respondents used to be or are now members of environmental protection organizations; 47. 5% of the respondents said that they were practicing environmental protection every day, such as recycling resources, reducing the use of plastics, taking MRT, climbing stairs to reduce taking elevators, bringing environmental cups and shopping bags by themselves, replacing locomotives with bicycles when ever possible.

(2) Analysis results of linear structural equation model

In terms of the appropriateness measurement indicators for the linear structural equation model, the respondents in this study have good results in all indicators. Only RMSEA value is less than. 05, AGFI value is less than. 90, TLI value is less than. 90; the other GFI, AGFI, NFI, RFI, CFI, IFI, TLI values are more than. 90. It shows that the respondents' behavior model of purchasing green funds proposed in this study is adaptable to the sample data (Table 2).

In the verification of each variable, perceived behavioral control (beta >. 51, p< 0. 001) and attitude (beta >. 22, p< 0. 01) can predict respondents' willingness to buy green funds; sense of environmental responsibility (beta >. 20, p< 0. 001) plays the role of moderator variable for attitude and perceived behavioral control affecting purchasing willingness. Perceived price (beta >. 12, p< 0. 01) can negatively affect attitude (See Figure 1. at the end of this article).

Discussion and Suggestions

(1) Perceived behavioral control is the variable with greatest influence

The results of structural equation model shows that perceived behavioral control is an important variable for predicting respondents' willingness to purchase green funds. It means that before purchasing green funds, the respondents will first consider they have fully understood the profitability investment content and price change of green fund as well as their self-evaluation on the convenience of the purchase of green fund. The researcher also found similar cases when distributing questionnaires, i. e. , the respondents will normally first talk about the profitability investment content and price change of the green fund before considering buying it. Therefore, to enhance general investors' wiliness to purchase green fund, this research proposes to provide simple and easy- to-understand graphic manuals or websites for investors to encourage them to buy funds beneficial to environmental protection. Graphic manuals and website content should have simple and easy-to-understand Q&A, or examples in the form of images or cartoons to illustrate why green funds are helpful to global environmental protection and also helpful for people in the world to improve their living quality, how to be environmental friendly, what green funds are available in the world, and the impact of green funds on the life of the general public.

This research also made three suggestion for improving investors' knowledge and acknowledgement for green funds: (1) encourage Taiwan's financial industry to show investors the contents of green funds and their benefits to environmental protection, and show them examples of green funds that have performed well recently; (2) the government gives financial industry incentives or subsidies to encourage financial practitioners to organize green fund seminars to raise investors' awareness and purchasing willingness of green funds; (3) the government can subsidize green fund investors to make field visit at the site of Taiwan's green fund practitioners, where they can get illustration on the management mode

of green enterprises on the spot.

(2) Influence of environmental responsibility is higher than perceived price

Perhaps because of the global warming in recent years and frequent natural disasters everywhere, these respondents are deeply impressed by the impact of the environment on the world and Taiwan. Many respondents (about 35) are even with high environmental protection awareness, who mentioned in the interview that they purchase green fund to support green enterprises and return on investment is not the only thing they care about. Other 89 respondents mentioned that they highly emphasized the change of global environment and that there would only be sustainable industrial development when people protect the earth well. Therefore, they are willing to choose the green funds that have relatively lower return on investment and higher price as a contribution to the earth environment. This research suggests that to encourage more investors to buy green funds, it is necessary to strengthen the explanation of the seriousness of the current global environmental change, and illustrate with examples that environmental protection can be improved through some activities in daily life. For example, the purchase of green funds is an environmental protection behavior that can achieve energy saving and carbon reduction purposes

(3) Possible reasons for environmental value not affecting attitude

While interviewing respondents, the researchers found that although many respondents believed that human behaviors had seriously impacted the environment and ecology, and agreed that green funds could reduce the impact of human beings on the natural ecology, they also said that there was no necessary relationship between acknowledging that human beings had impacted the natural ecology and global environment and the purchasing of green funds. For example, global warming also results from the cyclical changes of the earth. Although human beings do destroy the environment, it is only one of the factors of global warming and cannot blame the development of human beings. Secondly, some respondents also believe that human beings should really worry that the industrial development will reduce global biodiversity, green space and air quality, and all kinds of pollution may have seriously contaminated the drinking water everywhere. However, the way to reduce this pollution is not only through the purchase of green funds, but also other improvement measures including environmental policies and environmental education. Therefore, it is possible that attitudes cannot be pre-

dicted through environmental values.

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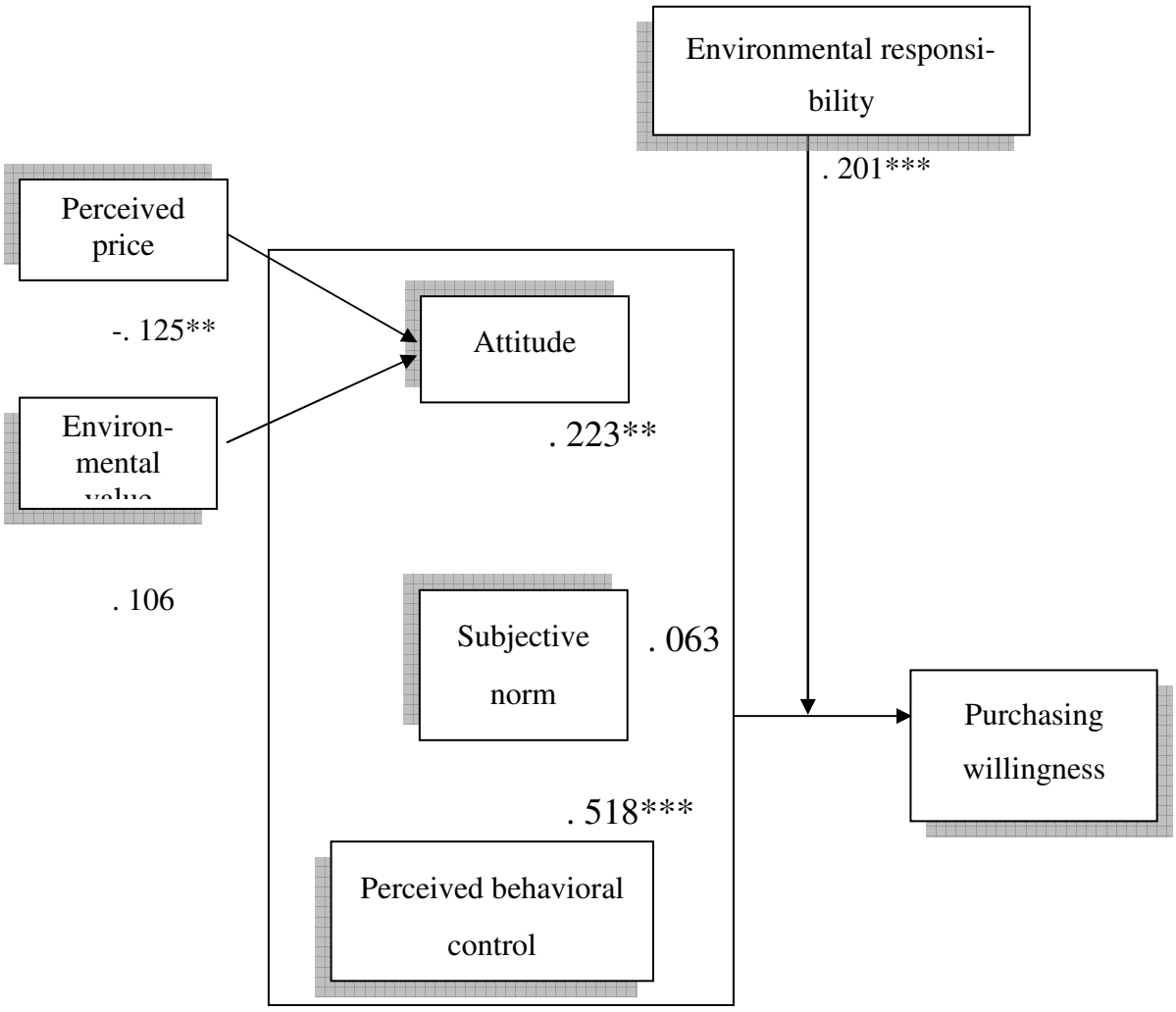

Figure 1. Framework Result