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# Climate Change Worry and Purchase Behavior Towards Biodegradable Plastic Bags: The New Approach

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**ABSTRACT**

Currently, climate change is causing significant threats to the survival of humanity and future generations. This study is designed to explore the purchase behavior towards biodegradable plastic bags by addressing significant advancements in the protection motivation theory (PMT): investigating the role of climate change worry (CCW) to trigger threat appraisal (TAP) or coping appraisal (CAP), the correlation between deontic justice (DJ), attitude (AT), and purchase intention (PUR), and filling cognition-behavior gap by adding green skepticism (GS). A non-probability sampling technique is employed with a data set of 1,284 Vietnamese consumers, which was analyzed using the SmartPLS program. The findings indicate that the AT mediates the correlations between CAP, TAP, DJ, and PUR. Simultaneously, green skepticism (GS) also plays as the moderator in the correlations between AT and PUR, CAP and PUR, TAP and PUR. Based on the findings, effective marketing campaign can be propose to highlight the possible dangers of environmental pollution to promote consumers' purchase behavior. Additionally, the findings also highlight the theoretical implications for future studies.

## 1. INTRODUCTION

Currently, loss of biodiversity, environmental pollution, and climate change cause significant threats to the survival of humanity and future generations. According to the report of UNs' Department of Economic and Social Affairs Statistics Division [1], the increasing worldwide reliance on lightweight, durable, and single-use plastics is a key factor contributing to contemporary environmental pollution. The report revealed that around 430 million tonnes of plastic are produced each year, and approximately 286 million tonnes, which is about two-thirds, become plastic waste. Then, 225 million tonnes of the plastic waste has been directly discharged into the environment, including oceans and land [2].

Vietnamese consumers are generating an estimated annual amount of plastic waste ranging from 2.8 million to 3.1 million tonnes per year [3]. Most plastic waste in Vietnam is made up of soft plastic fragments, plastic bags, foam food containers, and candy packaging, making up approximately 38% of the total plastic waste. According to the World Population Review [4], Vietnamese consumers discharge approximately 3 million tonnes of improperly managed plastic waste into nature each year, which contribute significantly to the plastic waste problem by disposing of approximately 27,130 tonnes of plastic waste into rivers and seas. Furthermore, Vietnam's oceans and rivers were severely contaminated by the cumulative amount of plastic beach litter that ended up as marine debris, totaling 191,061 tonnes [5]. In actuality, Vietnamese consumers prefer bringing plastic bags when they purchase at traditional markets, supermarkets, and convenient shops [6].

By integrating two theories such as the protection motivation theory (PMT), and attitude - behavior - context theory (ABCs), this study would respond to the call by Chen [7], and Joshi and Rahman [8] to examine the influence of psychological factors such as justice, skepticism or worry as the stimuli to PMT constructs, while previous researchers have not paid attention. Additionally, the study will inherit and expand the PMT from previous studies such as Kothe et al. [9], Ibrahim and Al-Ajlouni [10] and Chen [7] by combining PMT and ABC theories and adding green skepticism as a moderator into PMT. From there, the study will contribute to expanding the PMT theoretical model by filling the perception-behavior and attitude-behavior gap with contextual factors and lay the foundation for future studies on green consumption.

Therefore, to address the research gaps, this study is conducted to explore the correlations between threat appraisal (TAP), coping appraisal (CAP), attitude (AT), green skepticism (GS), climate change worry (CCW), and purchase intention towards biodegradable plastic bags (PUR). Then, the following three main research questions need to be answered:

RQ1: How do TAP, CAP, AT, DJ and GS impact PUR?

RQ2: How does AT mediate the correlations between TAP, CAP, DJ and PUR?

RQ3: How does GS moderate the impact of TAP, CAP, AT on PUR?

By answering the research questions, this study may provide valuable insights to help retailers and managers of manufacturers and traders of biodegradable plastic bags in Vietnam. The research contains five main parts: the introduction, the literature review, the methodology, the results, the conclusion, and the implications.

## 2. LITERATURE REVIEW

### 2.1 Theories

2.1.1 PMT theory

The PMT explains the influence of people's psychological to the intentions to act and how they cope with threats [11]. PMT describes the cognitive mediating processes that take place specifically: When a threat appears, and people are forced to face the threat, the human mind then evaluate the threat through appraisal processes such as CAP and TAP, which lead to the intention to take recommended actions [12, 13]. Additionally, due to the PMT, Plotnikoff and Trinh [13] have also proposed the OPMT (order protection motivation theory), which linked the two cognitive appraisals together.

2.1.2 ABCs theory

The ABCs was proposed by Guagnano et al. [14], which explains that the behavior is functioned by contextual and attitudinal factors. Dhir et al. [15] also argued that attitude could not fully control behavior; other contextual factors would increase the ability to predict behavior. Contextual factors could be legal, psychological [16], or other related factors [17-19] Thus, under the strong influence of contextual factors, the behavior can only be predicted when customers have positive attitude [20].

2.1.3 Biodegradable plastic bags

According to Jawaid et al. [21], biodegradable plastic bags is completely biodegradable, with reduced landfill use and the ability to apply agricultural resources to produce green or biological materials. In addition, biodegradable plastic bags can be considered one of the green products that effectively protects the environment [22]. Biodegradable plastic bags, according to the Packaging Association of Vietnam, are composed of naturally occurring materials that decompose quickly, like potatoes, corn starch or biodegradable plastic, which lessens reliance on fossil materials like oil [23].

### 2.2 Hypotheses development

2.2.1 TAP, CAP and PUR

According to Cismaru and Lavack [12], TAP is when the individuals realized how serious and susceptible a threat is and how susceptible they are to it, which can encourage adaptive behavior to help they deal with fear. TAP compromised three main components: perceived vulnerability (VUL), perceived severity (SEV), and maladaptive reward [24]. However, the reward for taking a risk and the expense of taking preventive action are typically ill-defined, and as such, they could be left out of the model [9]. There were previous studies in which the results proved the impact of TAP on green buying behavior [7, 10, 25, 26]. Therefore, the authors can argue that TAP can positively impact PUR.

**H1:** *TAP positively and directly influence PUR.*

Cismaru and Lavack [12] also argued that CAP involved the balance between the perceived effectiveness of a preventive action (response efficacy-REF) plus the perceived ability of oneself to engage in that preventive behavior (self-efficacy-SEF) for others minus the costs created by preventive behavior (response costs). The probability of selecting an avoidance action will rise in response to response costs, whereas the probability of selecting a response action will rise in the sum of REF and SEF [12]. However, Chen [7] has also argued that response costs should be excluded from CAP due to its negative impact. There were previous studies in which the results proved the impact of CAP on green buying behavior [7, 10, 27]. Therefore, the authors can argue that CAP can positively impact PUR.

**H2:** *CAP positively and directly influence PUR.*

Prior research indicates that behavioral intention will be influenced from TAP [12]. However, this effect is weaker than the positive impact of CAP, which indicates that the effects of CAP may overshadow the positive effects of TAP. From there, some scholars have conducted empirical studies and proven that CAP can fully mediates the relationship between TAP and behavioral intention [28]. This study's results differ from the study of Plotnikoff and Trinh [13], where coping appraisal only plays a partial mediating role due to different data and research contexts. Therefore, the authors can argue that TAP can indirect impact PUR through the mediating role of CAP.

**H3:** *TAP positively and directly influence CAP.*
**H4:** *CAP partially mediates the correlation between TAP and PUR.*

2.2.2 AT and PUR

In the theory of planned behavior (TPB), attitude towards a behavior is the main factor determining the behavioral intention [29]. Previous studies also examine the impact of AT on the purchase behavior of different products. Oh and Yoon [30] argued that AT substantially influences ethical consumption. The study by Cachero-Martínez [31] show the same results when AT is the strongest factor that influence the purchase behavior towards organic foods or green food [32]. The research of Mostafa [33] also highlights AT positive impact on Egyptian consumers' intention to buy green foods. Sadiq et al. [18] and Dhir et al. [15] also argued that AT strongly influences a consumers' purchase intention. In conclusion, AT can positively impact the intention to buy green products [34, 35].

**H5:** *AT positively and directly influence PUR.*

2.2.3 CCW, CAP and TAP

The concern about climate change primarily involves visual and verbal linguistic thoughts about possible changes in the climate's system and the possible influences of these changes, which can be repetitive, persistent, and difficult to control [36]. No scholars have measured the impact of fear on PMT constructs before, which cannot show the stimuli of TAP and CAP. Under green context, fear can be seen as CCW, which can trigger appraisal processes. Besides, fear is one of the most important factors that will trigger TAP or CAP, meaning this factor can positively influence the appraisal processes [12]. When people face a threat (through fear or worry), they begin assessing it through TAP or CAP. If the results of these

processes are positive, then adaptive behavior will be formed to cope with threats. Previously, some researchers have applied PMT constructs to explore pro-environmental behavior or green consumption [7, 10], but no research measured fear and threat. Therefore, the authors can argue that CCW can positively impact TAP and CAP.

**H6:** *CCW positively and directly influence TAP.*
**H7:** *CCW positively and directly influence CAP.*

2.2.4 CAP, TAP and AT

According to previous research, the PMT aims to modify people's AT and intentions to behave [12]. Thus, some researchers try to explore the correlation between TAP, CAP and AT. Additionally, Tan and Lau [37] also argued about the role of AT in mediating the correlation between TAP, CAP and green buying behavior. To support the arguments, the previous research also prove that AT can partially mediated the correlation between TAP, CAP and the purchase intention towards organic foods [38, 39]. Therefore, the authors can argued that CAP and TAP directly and indirectly impact PUR through the mediating role of AT.

**H8:** *TAP positively and directly influence AT.*
**H9:** *CAP positively and directly influence AT.*
**H11a:** *AT partially mediates the correlation between TAP and PUR.*
**H11b:** *AT partially mediates the correlation between CAP and PUR.*

2.2.5 DJ, AT and PUR

According to Cropanzano et al. [40], the duty of justice is defined as treating others as they should or deserve to be treated by respecting standards of right and wrong. Beugre [41] argued that people will be aware of the duty of justice when they know their moral obligations (MOB), moral accountability (MA), and moral outrage (MOUT).

Besides, Shaw and Shiu [42] also argued that ethical obligation can significantly impact on AT. The relationship between ethical obligations and AT is particularly noteworthy, which is illustrated by how a person who feels ethically responsible for being a good citizen will feel better about doing something for the cause [43]. The research of Kumar et al. [44] also shows that at ethical obligation positively impacts AT towards green products. However, there are a lot of moral factors that can affect the AT, which lead to PUR; and ethical obligation is just one of them. Therefore, the authors can argue that other aspects of moral factors such as DJ (MOB, MA, and MOUT) can directly and indirectly impact PUR through the mediating role of AT.

**H10:** *DJ positively and directly influence AT.*
**H11c:** *AT partially mediates the correlation between DJ and PUR.*
**H12:** *DJ positively and directly influence PUR.*

2.2.6 Moderator: GS

GS refers to the tendency to doubt the credibility and effectiveness of products, particularly those that are new and not well-known [45]. Consumers exhibit skepticism towards the communication messages manufacturers provide when they introduce extensive information regarding the product's design, quality, value or features [46, 47]. Hence, the doubt and mistrust of consumers may negatively influence their buying habits.

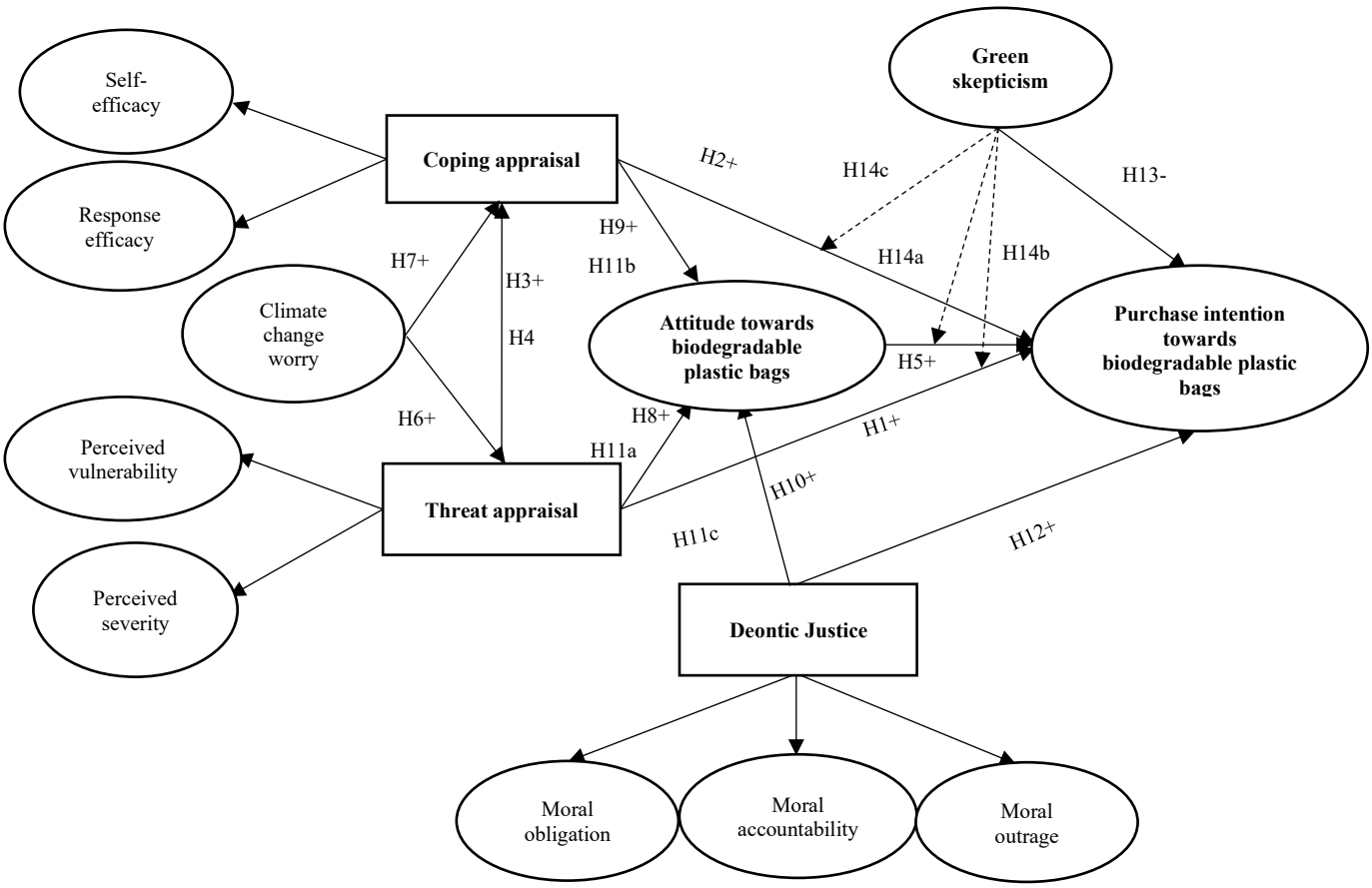


**Figure 1.** Research model

According to the ABCs, skepticism can be contextualized as the connection between consumers' AT and their behavior [20]. Within green consumption, skepticism can manifest as GS, which refers to doubts or questioning regarding green advertising or products [47-49]. The studies conducted by Uddin et al. [50], Zarei and Maleki [51] demonstrate that skepticism towards green advertising can influences the relationship between attitude and green buying behavior. Therefore, in the context of green consumption, skepticism is understood as green skepticism, which is the contextual factor that significantly influences the impact of attitude towards green products on purchase behavior.

There is a research gap in the relationship between cognition - behavior [25, 52, 53]. Scholars such as Deliana and Rum [25] have also undertook studies in the context of tourism to investigate this gap; however, they were unable to provide conclusive evidence regarding the moderating effects of skepticism. Then, the research gap needs to be paid attention both in theory and real life. In the medical field, by applying PMT theory, the study by Byrd et al. [54] successfully tested the role of skepticism (medical skepticism) in moderating and weakening the relationship between factors in PMT theory to address the research gap between cognitive - behavioral intention. Specifically, under normal conditions, the threat will trigger coping appraisal and increase the intention to perform recommended behaviors However, when medical skepticism appears and is at a high level, the intention to perform inappropriate behavior will be higher than the normal impact of coping appraisal [54]. Similarly, under the context of Marketing and following by the ABCs [20], the authors can argue that the impact of appraisal processes (coping appraisal and threat appraisal) on behavioral intention can be significantly influenced by green skepticism.

In sum up, the authors can argue that GS can substantially moderates the relationships between CAP to PUR, TAP to PUR and AT to PUR. Additionally, GS can also directly and indirectly impact PUR.

**H14a:** *GS substantially moderates the correlation between AT and PUR, meaning the higher GS is, the weaker the influence of AT on PUR.*
**H14b:** *GS substantially moderates the correlation between TAP and PUR, meaning the higher GS is, the weaker the influence of TAP on PUR.*
**H14c:** *GS substantially moderates the correlation between CAP and PUR, meaning the higher GS is, the weaker the influence of CAP on PUR.*
**H13:** *GS negatively and directly influence PUR.*

Based on the above hypotheses, the authors propose a research model, which is presented in Figure 1.

## 3. METHODS

### 3.1 Research methods

This study applies mix research methods such as qualitative and quantitative:

Qualitative research: After discussing with 10 customers who have known about purchased biodegradable plastic bags, the authors identified the factors and research objectives. Then, a literature review step was performed to find the research gaps, thereby building a model and original scale. Next step, the authors applied in-depth interview with five PhDs and two Associate Professors specializing in Business Administration and Marketing, seven directors of plastic bag companies and 20 consumers to adjust the measurement scales.

Preliminary quantitative survey: The authors conducted a preliminary survey with 450 respondents. The results of the survey show that all the factors achieved high reliability.

Formal quantitative research: the authors conducted formal survey with customer who have visited at shopping centers or mini stores in Southeast Vietnam, and online by through social medias (Zalo, Facebook, etc). About 1.500 questionnaire are distributed, and only 1,402 respondents returned (402 online and 1,000 offline), then Excel and SPSS software were used to filter out invalid responses. Finally, after eliminating 118 invalid respondents, there are 1,284 respondents left to evaluate the measurement and SEM through SMARTPLS software

### 3.2 Measurements

The final measurement scale of this study contains 54 observed factors. The final measurement scale uses a 5-point Likert scale, which is suitable for this study. All measurement scales used in the study are adopted from reliable sources. Ten measurement items assessing CCW are sourced from Stewart [36]. Four items assessing SEV are sourced from Ibrahim and Al-Ajlouni [10]. Six items assessing VUL are sourced from Shafiei and Maleksaeidi [55], and Ibrahim and Al-Ajlouni [10]. The measurement scale for SEF includes five items that sourced from Chen [7], and Ibrahim and Al-Ajlouni [10]. Four measurement items evaluating REF are sourced from Almarshad [56], and Ibrahim and Al-Ajlouni [10]. Four items assessing AT are sourced from Wang et al. [57] and Alam et al. [34]. Four measurement items assessing GS are sourced from the study by Leonidou and Skarmeas [48]. PUR is measured by a scale of five items adopted from Tan et al. [39], and Ibrahim and Al-Ajlouni [10].

### 3.3 Data collection

This study has employed a cross-sectional approach and a convenient sampling technique. The following categories apply to the sample sizes: According to Comrey and Lee [58], 100 for poor, 200 for medium, 300 for good, 500 for very good, and 1,000 or more for exceptional. In addition, Tabachnick and Fidell [59] argued that when examining a SEM model, a sample size of 300 is fine, and 500 and beyond are extremely good. Therefore, the survey of this study is roughly 1,402 respondents, who are 402 online and 1,000 offline. Southeast Vietnamese consumers are the survey's target respondents.

## 4. RESULT

### 4.1 Descriptive statistics

The results of Table 1 show that out of the 1,284 respondents, there are 679 females, representing 52.88% of the total. Analysis of the data from Table 1 indicates that the age between 35 and 45 years old has the highest proportion, totaling 417 individuals, representing 32.48% of the sample. Table 1 also shows that out of the total respondents, 706 respondents are married and have children, which accounts for 54.98% of the sample and the highest proportion.

**Table 1.** Descriptive statistics

| Gender | 1,284 | 100% |
|---|---|---|
| **Male** | 605 | **47.12%** |
| **Female** | 679 | **52.88%** |
| **Age group (years old)** | **1,284** | **100.00%** |
| **18-25** | 89 | 6.93% |
| **26-34** | 345 | 26.87% |
| **35-45** | 417 | 32.48% |
| **46-54** | 389 | 30.30% |
| **>55** | 44 | 3.43% |
| **Martial Status** | **1,284** | **100.00%** |
| **Unmarried** | 330 | 25.70% |
| **Married+no child** | 247 | 19.24% |
| **Married+children** | 706 | 54.98% |
| **Divorced** | 1 | 0.08% |
| **Education** | **1,284** | **100.00%** |
| **Middle/High school** | 43 | 3.35% |
| **Vocational intermediate** | 57 | 4.44% |
| **Junior college** | 166 | 12.93% |
| **University** | 951 | 74.07% |
| **Postgraduate** | 67 | 5.22% |
| **Income (USD)** | **1,284** | **100.00%** |
| **Under 400 USD** | 111 | 8.64% |
| **400 to under 600 USD** | 250 | 19.47% |
| **600 to under 800 USD** | 646 | 50.31% |
| **800 to under 1,250 USD** | 197 | 15.34% |
| **1,250 to under 1,650 USD** | 66 | 5.14% |
| **> 1,650 USD** | 14 | 1.09% |

In addition, 951 participants possess university degrees, representing the majority of 74.07% of the sample. Furthermore, among the entire pool of participants, 646 individuals (50.31%) indicated an income falling within the range of 600 to under 800 dollars, representing the highest proportion. The detail results are shown in Table 1.

### 4.2 Data screening

For data screening, this study applied the Harman single factor test by utilizing the SPSS 26 software. The findings indicate that the dataset does not exhibit any prevalent bias issues, a single factor accounts only 21.395% of the variance, less than 50% [60]. The normality test is also conducted by the kurtosis and skewness tests. The results suggest that the data set is distributed normally because the kurtosis and skewness values fall within ± 2 [61].

### 4.3 Reliability, validity and discriminability

After removing CCW9, VUL6 and PUR5 due to low indicators loading, the authors conducted a test for higher-order variables after retrieving the values of latent variables of SER, VUL, REF, SEF, MA, MOB, and MOUT. In Table 2, the CA and CR are higher than 0.7, the AVE is over 0.5, meaning all the items are satisfied [62]. In Table 3, all the variables' HTMT values are lower than the 0.85 threshold, which implies the achievement of discriminability [62]. The observed variables' variance inflation factors (VIFs) ranged from 1.423 to 2.909(<3), and there is no presence of multicollinearity [62]. Furthermore, the results of Table 4 indicate that the value of SRMR is 0.067 (<0.08), showing a good fit of the model [63, 64].

**Table 2.** Validity and reliability of higher-order variables

| Variables | Indicator Loading | CA | CR | AVE | VIFs |
|---|---|---|---|---|---|
| **TAP** | | **0.762** | **0.894** | **0.808** | |
| LV scores-SER, LV scores-VUL | 0.894-0.904 | | | | 1.611 |
| **CA** | | **0.759** | **0.892** | **0.805** | |
| LV scores-REF, LV scores-SEF | 0.889-0.906 | | | | 1.596 |
| **DJ** | | **0.748** | **0.856** | **0.665** | |
| LV scores-MA, LV scores-MOB, LV scores-MOUT | 0.768-0.839 | | | | 1.371-1.621 |
| **CCW** | | **0.940** | **0.949** | **0.676** | |
| CCW1, CCW2, CCW3, CCW4, CCW5, CCW6, CCW7, CCW8, CCW10 | 0.786-0.843 | | | | 2.514-2.909 |
| **GS** | | **0.832** | **0.888** | **0.665** | |
| GS1, GS2, GS3, GS4 | 0.800-0.830 | | | | 1.718-1.910 |
| **AT** | | **0.842** | **0.894** | **0.679** | |
| AT1, AT2, AT3, AT4 | 0.723-0.874 | | | | 1.488-2.208 |
| **PUR** | | **0.886** | **0.921** | **0.745** | |
| PUR1, PUR2, PUR3, PUR4 | 0.846-0.885 | | | | 2.142-2.582 |

**Table 3.** Discriminality of higher-order variables (Heterotrait - Monotrait criterion)

| | AT | CAP | CCW | DJ | GS | PUR | TAP | GSxCAP | GSxAT | GSxTAP |
|---|---|---|---|---|---|---|---|---|---|---|
| **AT** | | | | | | | | | | |
| **CAP** | 0.370 | | | | | | | | | |
| **CCW** | 0.116 | 0.185 | | | | | | | | |
| **DJ** | 0.428 | 0.361 | 0.178 | | | | | | | |
| **GS** | 0.289 | 0.153 | 0.124 | 0.306 | | | | | | |
| **PUR** | 0.653 | 0.391 | 0.241 | 0.572 | 0.617 | | | | | |
| **TAP** | 0.435 | 0.307 | 0.314 | 0.558 | 0.492 | 0.677 | | | | |
| **GSxCAP** | 0.033 | 0.214 | 0.028 | 0.050 | 0.082 | 0.188 | 0.054 | | | |
| **GAxAT** | 0.116 | 0.042 | 0.065 | 0.115 | 0.134 | 0.227 | 0.200 | 0.294 | | |
| **GSxTAP** | 0.153 | 0.043 | 0.074 | 0.304 | 0.430 | 0.508 | 0.306 | 0.232 | 0.398 | |

**Table 4.** Path coefficients of the hypotheses

| Hypotheses | Relationship | Standardized Beta ($\beta$) | Confidence Intervals | *p*-Values | VIFs | Conclude |
|---|---|---|---|---|---|---|
| | | | ***Direct effects*** | | | |
| H1 | TAP→PUR | 0.186 | [0.145-0.226] | 0.0000 | 1.497 | Accept |
| H2 | CAP→PUR | 0.118 | [0.079-0.158] | 0.0000 | 1.214 | Accept |
| H3 | TAP→CAP | 0.207 | [0.157-0.256] | 0.0000 | 1.078 | Accept |
| H5 | AT→PUR | 0.351 | [0.312-0.390] | 0.0000 | 1.331 | Accept |
| H6 | CCW→TAP | 0.270 | [0.221-0.320] | 0.0000 | 1.000 | Accept |
| H7 | CCW→CAP | 0.101 | [0.048-0.154] | 0.0000 | 1.078 | Accept |
| H8 | TAP→AT | 0.224 | [0.168-0.278] | 0.0000 | 1.243 | Accept |
| H9 | CAP→AT | 0.197 | [0.145-0.247] | 0.0000 | 1.100 | Accept |
| H10 | DJ→AT | 0.190 | [0.135-0.246] | 0.0000 | 1.269 | Accept |
| H12 | DJ→PUR | 0.116 | [0.078-0.154] | 0.0000 | 1.357 | Accept |
| H13 | GS→PUR | -0.252 | [-0.289 to -0.215] | 0.0000 | 1.412 | Accept |
| | | | ***Indirect effects*** | | | |
| H4 | TAP→CAP→PUR | 0.024 | [0.015-0.035] | 0.0000 | | Accept (partial mediating effect) |
| H11a | TAP→AT→PUR | 0.079 | [0.059-0.100] | 0.0000 | | Accept (partial mediating effect) |
| H11b | CAP→AT→PUR | 0.069 | [0.050-0.090] | 0.0000 | | Accept (partial mediating effect) |
| H11c | DJ→AT→PUR | 0.067 | [0.047-0.089] | 0.0000 | | Accept (partial mediating effect) |
| | | | ***Moderating effects*** | | | |
| H14a | GSxAT→PUR | -0.109 | [-0.148 to-0.074] | 0.0000 | 1.406 | Accept |
| H14b | GSxTAP→PUR | -0.148 | [-0.178 to-0.118] | 0.0000 | 1.533 | Accept |
| H14c | GSxCAP→PUR | -0.095 | [-0.128 to-0.064] | 0.0000 | 1.178 | Accept |
| | | | ***Adjusted $R^2$*** | | | |
| | | | $R^2$ AT: 0.200 | | | |
| | | | $R^2$ CAP: 0.063 | | | |
| | | | $R^2$ PUR: 0.653 | | | |
| | | | $R^2$ TAP: 0.072 | | | |

### 4.4 Structural model results

The researchers conducted the bootstrapping approach with a sample of 10,000 to evaluate the research model. According to Hair et al. [62], the author would examine the determination coefficient ($R^2$), statistical significance, and the relevance of path coefficients.

In Table 4, $\beta$ of the direct relationships between threat appraisal (TAP) and purchase intention (PUR), coping appraisal (CAP) and PUR, TAP and CAP, attitude (AT) and PUR, climate change worry (CCW) and TAP, CCW and CAP, TAP and AT, CAP and AT, deontic justice (DJ) and AT, DJ and PUR, green skepticism (GS) and PUR are 0.186, 0.118, 0.207, 0.351, 0.270, 0.101, 0.224, 0.197, 0.190, 0.116, and -0.252, respectively. The findings show that AT, CAP, DJ, and TAP positively impact PUR while GS negatively impacts PUR. In addition, the results also show that higher TAP can positive increase CAP while both TAP and CAP positively impact AT. Finally, due to the PMT, CCW can trigger both TAP and CAP.

The results demonstrate that hypotheses H4, H11a, H11b, and H11c are accepted with $\beta$ of the mediating correlations between TAP→CAP→PUR is 0.024, TAP→AT→PUR is 0.079, CAP→AT→PUR is 0.069, and DJ→AT→PUR is 0.067. The findings show that AT and CA play as partial mediators in the model. In addition, it is important to acknowledge the influence of GS on the correlations between AT→PUR, TAP→PUR, CAP→PUR, as indicated by $\beta$ of -0.109, -0.148, and -0.095, respectively. The findings provide empirical evidence in favor of hypotheses H14a, H14b, and H14c, indicating that an increase in GS significantly impact the relationship between AT→PUR, TAP→PUR, and CAP→PUR (Figures 2, 3, and 4). In summary, there are 12 direct effects, 4 indirect effects and 3 moderating effects in the SEM model showing in Figure 5.

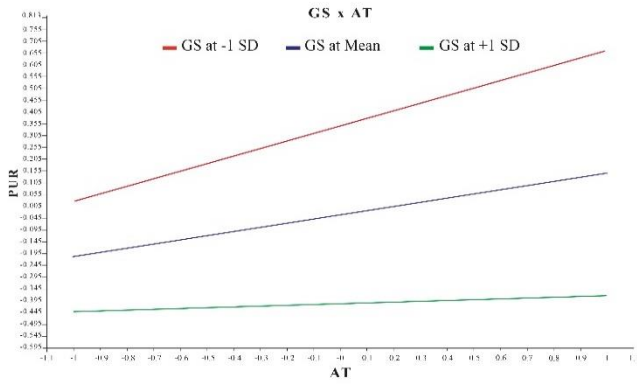


**Figure 2.** GS moderates the influence of AT to PUR

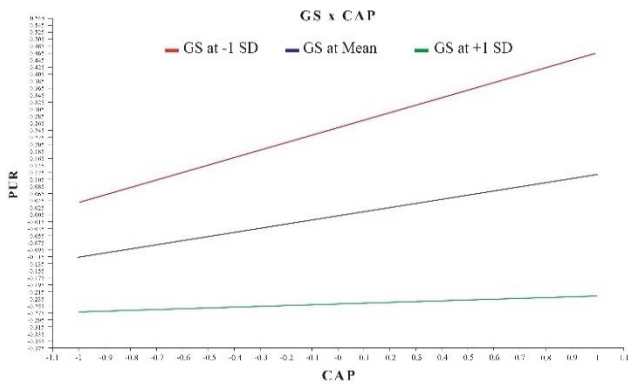


**Figure 3.** GS moderates the influence of CAP to PUR

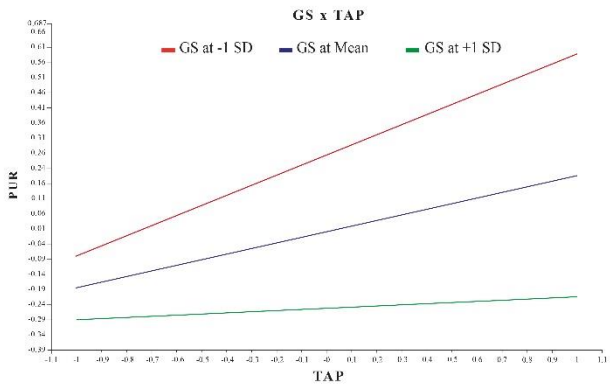


**Figure 4.** GS moderates the influence of TAP to PUR

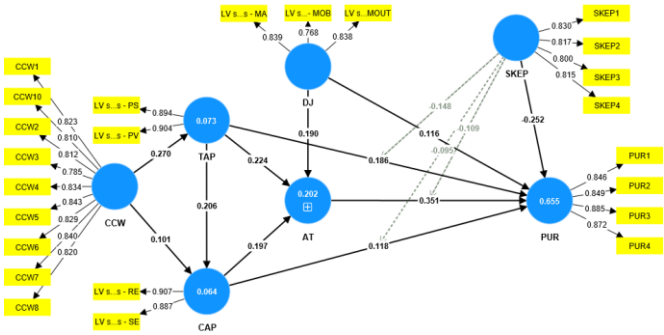


**Figure 5.** The results of proposed hypotheses

### 4.5 Discussion

Due to the results, hypotheses H1 and H2 are accepted, indicating that TAP and CAP positively impact PUR, with $\beta$ of 0.186 and 0.118, which are consistent with previous studies [7, 10, 26]. Hypothesis H12 is accepted, demonstrating that DJ is a fundamental aspect of PMT and positively impacts PUR with $\beta$ of 0.116. The results are similar to the findings of previous research by Ibrahim and Al-Ajlouni [10]. Additionally, hypothesis H5 is supported, suggesting that AT positively affects PUR with $\beta$ of 0.351. The results suggest that AT is the factor that mostly predict PUR, which are consistent with studies by Qi and Ploeger [32], and Sadiq et al. [18]. In contrast, the acceptance of hypothesis H13 suggests that GS would negatively impact on PUR. These findings are consistent with the study conducted by Sääksjärvi and Morel [47], indicating that customers tend to be doubtful of novel products, this skepticism can result in a decline in their inclination to buy such products.

The data provides evidence in accepting of Hypothesis H3, suggesting that TAP positively influences CAP, as indicated by $\beta$ of 0.157, which is consistent with the research by Plotnikoff and Trinh [42] and Yasami [28]. In addition, hypotheses H6 and H7 are accepted with $\beta$ of 0.270 and 0.101, respectively. The results are consistent with the original PMT model, suggesting that similar outcomes are seen when worry or fear strongly impacts how individuals evaluate threats [12]. The results also confirm hypotheses H8, H9, and H10, demonstrating that TAP, CAP and DJ positively impact AT, with $\beta$ of 0.224, 0.197, and 0.190, respectively. The findings support the arguments made by Cismaru and Lavack [12] and Kumar et al. [44], regarding the impact of PMT constructs and moral factors on the change in attitude towards behavior.

The findings support Hypothesis H4, demonstrating that CAP can play as the mediator in the correlations between TAP and PUR, with $\beta$ of 0.024. The hypotheses H11a, H11b, and H11c are supported, suggesting that AT act as the partial mediator in the relationships between TAP and PUR, CAP and PUR, DJ and PUR, with $\beta$ of 0.079, 0.069, and 0.067, respectively. The findings are consistent with the studies carried out by Kumar et al. [40], Pang et al. [38], Tan et al. [39]. Furthermore, the findings of this study are different from the research conducted by Pang et al. [38], Tan et al. [39], which show the full mediating impact of AT in the PMT. The differences can be explained because customers cannot find links between environmental protection and buying behavior towards organic foods.

Hypothesis H14a is accepted with $\beta$ of -0.109, suggesting that the impact of AT to PUR can de diminishes as GS increases. The findings are consistent with the research by Uddin et al. [50], suggesting Asian customers demonstrate a significant skepticism towards novel products. These customers exhibit prudence when making purchases, even if they favor new products. Hypotheses H14b and H14c are accepted, with $\beta$ of -0.148 and -0.095, respectively, suggesting that GS significantly influences the connections between TAP and PUR, CAP and PUR. The findings indicate that as the level of doubt towards environmental claims grows, the relationship between evaluating the potential risks and the intention to buy and the relationship between assessing how to deal with those risks and the intention to buy becomes less strong. The findings show that there are existed research gaps between perception - behavior, which arguing by Byrd et al. [54], or Deliana and Rum [25].

## 5. CONCLUSION AND MANAGERIAL IMPLICATION

### 5.1 Conclusion

The author conducted this study to investigate the connections between CAP, TAP, AT, DJ, and PUR while examining the role of AT or CAP as mediators and GS as a moderator in the research model. The findings show that AT has the most significant impact on PUR, followed by GS, TAP, CAP, and DJ. Furthermore, CAP is the partial mediator in the connection between TAP and PUR, and AT partially mediates the correlations between CAP and PUR, TAP and PUR, and DJ and PUR. Furthermore, GS acts as a moderator, which reduces the relationships between AT and PUR, CAP and PUR, and TAP and PUR.

Based on the findings, the author would propose managerial implications that Vietnam's plastic producers can change their manufacturing practices to produce biodegradable plastic bags. This study, which looks at the link between the PMT and ABCs in the current environment, offers more proof in favor of the PMT. The PMT is expanded in this study by including DJ and CCW. Furthermore, the study closes the gaps between perception and behavior that have been noted in other studies. This study might be a great resource for future sustainable consumption investigations.

### 5.2 Managerial implications

The author would provide practical recommendations for plastic manufacturers in Vietnam based on the findings. These recommendations aim to incentivize manufacturers to shift

their production towards producing biodegradable plastic bags, which can be achieved by promoting the demand of the products. Effective advertising campaigns could be implemented by combining both online platforms and traditional advertising while incorporating compelling and strong media messages. These advertisements' media messages can highlight the possible dangers of plastic pollution that customers may encounter, encouraging them to evaluate how to tackle the problem and understand the risk, ultimately enhancing customers' perception of the product. Moreover, these advertisements can direct individuals towards resolving the issue by promoting the acquisition of biodegradable plastic bags, thus effectively addressing the problem of plastic pollution in Vietnam.

Furthermore, green skepticism significantly reduces customers' intention to purchase, as it diminishes the impact of their attitudes and evaluation processes. There is a relatively low level of interest in purchasing the products, as evidenced by an average score below 3. This phenomenon can be attributed to a significant level of skepticism among consumers, even though their attitudes and evaluation procedures are positive. To address the issue of widespread doubt about environmentally friendly claims, a viable approach is to create a package that integrates an eco-label with detailed product characteristics. Customers can alleviate their product uncertainties by closely examining eco-labels and comprehending the product attributes, as these provide explicit information about the products. In addition, plastic manufacturers can suggest decreasing taxes to the Vietnamese government, which would result in lower production costs and increase consumer appraisal processes, leading to higher intention to buy the products. Companies may also explore expanding their distribution channels through strategic partnerships with convenience stores like WinMart, CircleK, GS25, or Co.op Food, where consumers can easily acquire biodegradable plastic bags.

### 5.3 Limitations

This study also has some limitations due its own characteristics. Firstly, the research was conducted specifically in lower- and middle-income countries, and Vietnam was among the countries included. Consumer in other countries has different cultural backgrounds and incomes that lead to different behavioral intention. Then, future studies can examine the desire to acquire biodegradable plastic bags in other countries with different income levels or cultural backgrounds. Additionally, the research solely concentrated on some psychological aspects, particularly green skepticism or climate change worry, within the framework. This concentration resulted in the factors in the model only explaining 65.3% of purchase intention towards biodegradable plastic bags. Future research can explore additional psychological variables, such as hope or trust, to understand better about consumers' purchase behavior and extend the proposed research model. Furthermore, Cismaru and Lavack (2006) [12] have also argued that the constructs of the PMT only affect customers' attitudes and do not consider the other constructs of TPB or TRA. To enhance comprehension of green purchase behavior, further research can explore the role of additional constructs from the TRA or TPB, such as subjective norms or perceived behavioral control. Finally, given the limited time, the research utilized a cross-sectional approach and a convenient sampling method. This method can raise bias to the research results even though the author has employed the data screening step before SEM analysis. Future researchers should undertake a longitudinal study or apply other sampling method to examine the influence of CAP and TAP on PU.

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**APPENDIX**

**Appendix A.** Measurement scales

| Constructs | Items | Sources |
|---|---|---|
| | **Perceived Vulnerability** | |
| VUL1 | Buying products packaged in plastic packaging can have very negative impacts on my life experience. | Ibrahim and Al-Ajlouni [10] |
| VUL2 | Buying products packaged in plastic packaging can threaten my health. | |
| VUL3 | Buying products packaged in plastic packaging can threaten my quality of life. | |
| VUL4 | Plastic packaging pollution can negatively affect me. | Shafiei and Maleksaeidi [55] |
| VUL5 | I may be affected by the negative impacts of pollution caused by plastic packaging. | |
| VUL6 | I am vulnerable to the negative effects of plastic packaging pollution. | |
| | **Perceived Severity** | |
| SER1 | The use of plastic packaging causes negative impacts on the environment. | Ibrahim and Al-Ajlouni [10] |
| SER2 | Plastic packaging pollution can threaten my health and society. | |
| SER3 | Plastic packaging pollution can have negative impacts on my quality of life. | |
| SER4 | Plastic packaging pollution can lead to the depletion of limited resources. | |
| | **Self-Efficacy** | |
| SEF1 | I can prioritize changing my preferences in using biodegradable plastic bags. | Ibrahim and Al-Ajlouni [10] |
| SEF2 | I am self-conscious about using biodegradable plastic bags. | |
| SEF3 | I feel proud because I use biodegradable plastic bags. | |
| SEF4 | Changing my daily habit of using plastic packaging will help reduce plastic packaging pollution. | Chen [7] |
| SEF5 | I believe that my action of using biodegradable plastic bags will contribute to reducing plastic packaging pollution. | |
| | **Response Efficacy** | |
| REF1 | I believe purchasing biodegradable plastic bags is effective in preventing plastic pollution. | Ibrahim and Al-Ajlouni [10] |
| REF2 | I believe purchasing biodegradable plastic bags will help prevent the depletion of scarce resources. | |
| REF3 | I believe purchasing biodegradable plastic bags will help minimize the impacts of environmental pollution on me and social safety. | |
| REF4 | I believe that purchasing biodegradable plastic bags will help protect humanity and future generations. | Almarshad [56] |
| | **Moral Obligation** | |
| MOB1 | I feel an obligation to minimize my impact on plastic packaging pollution. | Chen [7] |
| MOB2 | I feel obligated to minimize my impact on plastic packaging pollution for future generations. | |
| MOB3 | I feel it is ethical to buy biodegradable plastic bags to help reduce plastic packaging pollution. | Alam et al. [34] |
| MOB4 | I feel sorry for everyone if I use plastic packaging. | |
| | **Moral Accountability** | |
| MA1 | Those who treat others unfairly will suffer the consequences. | Ibrahim and Al-Ajlouni [10] |
| MA2 | People who treat others unfairly deserve to be punished. | |
| MA3 | Identifying cases of unfair treatment of others is extremely important. | |
| MA4 | People who treat others unfairly must be held accountable for their actions. | |
| | **Moral Outrage** | |
| MOUT1 | I feel sad when I see others being treated unfairly. | Ibrahim and Al-Ajlouni [10] |
| MOUT2 | I feel uncomfortable when others are not treated fairly. | |
| MOUT3 | I feel sad because of the injustice caused to others. | |
| MOUT4 | I feel concerned about injustices that happen to others. | |
| | **Green Skepticism** | |
| GS1 | I am not sure that biodegradable plastic bags are an environmentally friendly product. | Leonidou and Skarmeas [48] |
| GS2 | I cannot be sure that biodegradable plastic bags cause less negative influences on the environment than other products. | |
| GS3 | I cannot be sure that biodegradable plastic bags meet strict environmental standards. | |
| GS4 | I am unsure whether biodegradable plastic bags are better for the environment than other products. | |
| | **Climate Change Worry** | |
| CCW1 | I worry about climate change more than other people. | Stewart [36] |
| CCW2 | Thoughts about climate change cause me to have worries about what the future may hold. | |
| CCW3 | I tend to seek information about climate change in the media (e.g., TV, newspapers, internet). | |
| CCW4 | I tend to worry when I hear about climate change, even when the effects of climate change may be some time away. | |
| CCW5 | I worry that severe weather outbreaks may result from a changing climate. | |
| CCW6 | I worry about climate change so much that I feel paralyzed in being able to do anything about it. | |

| | | |
|---|---|---|
| CCW7 | I worry that I might not be able to cope with climate change. | |
| CCW8 | I notice that I have been worrying about climate change. | |
| CCW9 | Once I begin to worry about climate change, I find it difficult to stop | |
| CCW10 | I worry about climate change more than other people. | |
| | **Attitudes towards biodegradable plastic bags** | |
| AT1 | I like biodegradable plastic bags. | |
| AT2 | I feel the positive effects of biodegradable plastic bags. | Alam et al. [34] |
| AT3 | According to me, biodegradable plastic bags are good for the natural environment. | |
| AT4 | I feel proud when I buy biodegradable plastic bags. | Wang et al. [57] |
| | **Purchase intention towards biodegradable plastic bags** | |
| PUR1 | I am excited about buying biodegradable plastic bags. | Ibrahim and Al-Ajlouni [10] |
| PUR2 | I can afford to buy biodegradable plastic bags. | |
| PUR3 | I will consider buying biodegradable plastic bags in the near future because they cause less pollution. | |
| PUR4 | I plan to purchase biodegradable plastic bags in the future because of its positive impact on the environment. | Tan et al. [39] |
| PUR5 | I will definitely buy biodegradable plastic bags in the near future. | |