



Understanding the Role of Environmental Concern in Green-Product Purchase Intention Investigating Perceived Policy Effectiveness in the Theory of Planned Behaviour

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Abstract. Environmental problems have gradually become a hot-button issue that cannot be ignored. Green products are receiving widespread attention due to their environmental benefits and contributions to a green economy. However, earlier studies have not thoroughly considered the role of environmental concern and government policies on green-product purchase intentions. This study aimed to evaluate people's green-product purchase intentions using an extended framework of the theory of planned behaviour (TPB). It examined the moderating effect of perceived policy effectiveness and analysed groups with high vs. low environmental concern. An online survey was conducted in China, and the study's results again proved the applicability of the TPB in this field while verifying the positive relationship of perceived policy effectiveness on purchase intention and its moderating effect on the TPB constructs. Furthermore, the results suggested that people with high environmental concern are more spontaneous in their purchase intentions, while those with low environmental concern are driven by the subjective norm. This study's findings contribute to improving the understanding of green-product purchase intention, which has significant implications for policymakers who play an essential role in sustainable consumption and for follow-up research in this field.

Keywords: Green product · Purchase intention · Theory of planned behaviour · Perceived policy effectiveness · Environmental concern

1 Introduction

In recent years, the adverse impacts of global environmental problems on societies worldwide have become prominent. Environmental problems have become one of the most significant challenges facing humankind [1]. Many countries have defined the timeline for carbon neutralization, and the reduction of greenhouse gas emissions has gradually become a 'self-help' movement of humankind [2]. Green products are environmentally friendly products that can effectively utilize resources, contribute to ecological balance and create less pollution and cause less harm to the environment and to consumers throughout the entire process of research and development, production, manufacturing,

sales and use, elimination, and disposal [3]. The Commission of the European Communities [4] encourages citizens to purchase green products since doing so can positively reduce the negative impacts on the ecological environment and reduce the effects of climate change [5].

Previous literature [6, 7] has suggested that it is essential to understand consumers' purchase intentions towards green products. Moreover, recent evidence has shown that 'green purchasing behaviour is a multifaceted phenomenon with many determinants and should not be studied as a single general concept' [8]. With the support of previous studies on pro-environmental behaviour [9, 10], Dangelico [8] conducted a detailed and comprehensive study using the extended TPB theory and summarized the determinants of green-product purchasing behaviour. However, most existing studies [7, 8, 11, 12] have focussed narrowly on individual and situational factors affecting green purchasing behaviour, such as psychological benefit, social values, functional values, price, etc. Recently, environmental concern and government policy were considered to have an important impact on the purchase intention of the green products [8, 13]–[16], but these haven't been thoroughly studied. According to Elmore [17], policy tools are the authoritative means to achieve a specific goal, potentially influencing individual and institutional conduct. Perceived policy effectiveness is used to measure people's perceptions of the effectiveness of policies. Previous studies have proved that government policy positively impacts customer purchase intention towards green products [13]. Recently, the Chinese government issued many policies regarding subsidies and identification systems for green products. Conducting an empirical study with a focus on China is worthwhile for verifying whether the effectiveness of government policy will promote people's intention to buy green products. Besides, previous studies have indicated that perceived policy effectiveness has a moderating effect on recycling and should be further studied in related fields [18]. However, no study thus far has investigated a moderating effect in the field of green products. Furthermore, environmental concern is considered a determinant of green-product purchasing behaviour. Although many studies have proved that people with high environmental concern are more likely to conduct green-consumption behaviour [19, 20], Bamberg [21] suggested that future research should not view environmental concern as a direct, but as an important indirect determinant of certain behaviours.

This study aims to identify those elements that affect green-product purchase intention. The main questions are:

Q1: How does perceived policy effectiveness affect green-product purchase intention?

Q2: How does perceived policy effectiveness moderates the relationship between the subjective norm, perceived behavioural control, and purchase intention?

Q3: How do environmental concern affect consumers' green-product purchase intentions?

Previous research has examined the theory of planned behaviour [22] to explain the factors that influence green-product purchasing behaviours [11, 15, 23, 24]. Driven by the research gaps and guided by the TPB, the aim of this study is to investigate what motivates people to purchase green products. A conceptual model is proposed based on an extension of the theory of planned behaviour, which sets environmental concern as

the antecedent variable for the whole model. The study also examines how perceived policy effectiveness moderates the relationship between the subjective norm, perceived behavioural control, and green-product purchase intention. The findings of this paper may have vital implications for policymakers who want to introduce policies to guide customers to buy green products and to facilitate the work of subsequent scholars who wish to refer to or quote when studying related topics.

2 Literature Review and Hypothesis Development

2.1 Theory of Planned Behaviour

The theory of planned behaviour (TPB) was adapted from the theory of reasoned action (TRA) by adding the variable of perceived behavioural control, which was first proposed by Ajzen [25]. The TPB compensates for the deficiency of the TRA and considers perceived behavioural control and behavioural intention together as reasons for individuals' actual behaviours [22]. The TRA assumes that people usually behave sensibly and that a person's intention to perform (or not to perform) a particular behaviour is the immediate determinant of that action [25]. The TPB was well-supported by a series of empirical evidence [22] and has become one of the most influential and popular conceptual frameworks for studying human behaviour [26].

Many recent studies have applied the TPB to explore an individual's green-product purchasing behaviour and to verify the feasibility of this theory for this research topic [11, 16, 24, 27]. For example, Maichum and Parichatnon's [24] experimental study on Thailand's customers showed that consumer attitude, subjective norm, and perceived behavioural control, which were core variables in the TPB had significant positive influences on the purchase intention for green products. Chaudhary and Bisai's [11] study using the TPB to examine the purchasing behaviour of millennials in India suggested that purchase intention (PI) was found to translate into green purchasing behaviour successfully. Thus, it is reasonable to apply this theory as a theoretical framework to investigate the factors affecting people's intention to purchase green products.

In previous research on green-product purchasing behaviour, many types of analyses were grounded in the TPB to conduct empirical investigations to serve commercial purposes since the TPB can help enterprises understand why consumers purchase green products. For example, Nekmahmud [28] surveyed Bangladeshis using the extended TPB, which includes how to improve internal marketing strategies to enhance the sales of green products from a company's perspective. This kind of research that produces advice for companies also appeared in Suki's research on customers' consumption values [29]. However, few studies have promoted the purchasing of green products from the perspective of government policies [13, 15].

The TPB includes three core constructs: attitude, subjective norm, and perceived behavioural control. Attitude (ATT) refers to 'the degree to which a person likes or dislikes a certain behaviour object (green product)' [26]. In addition, attitude includes judgement about whether a particular behaviour is good or bad and is the foremost predictor of behavioural intention. Sheppard's [30] empirical study identified a significant association between customer attitude and purchase intention. The findings of Wang and

Tang's [15] study also supported the significant attitude-intention relationship regarding green products.

Subjective norm (SN) is defined as 'the perceived social pressure to perform or not to perform the behaviour' [22], reflecting the social pressure that individuals perceive from significant others. People are more prone to adopt a particular behaviour if it is endorsed or supported by their significant others.

Perceived behavioural control (PBC) refers to the degree of ease or difficulty individuals think they can control and perform a certain behaviour [22]. PBC is similar to perceived self-efficacy, which considers internal control factors [31]. Contrary to Bandura's [31] concept of self-efficacy, defined as 'individual judgements of a person's capabilities to perform a behaviour', PBC emphasizes external and general factors. Numerous studies have shown that PBC was positively related to purchase intention in various research contexts, such as recycling [32], organic food [33], and green products [14].

In addition, a number of cross-cultural studies have demonstrated that the TPB framework is feasible in most fields [34, 35]. However, the relative importance of each TPB component still seemed to rely more on the characteristic of the target behaviour under investigation than on cross-cultural differences [34]. Accordingly, the following hypotheses are suggested:

H1: Attitude towards the green product is positively related to green-product purchase intention.

H2: Subjective norm is positively related to green-product purchase intention.

H3: Perceived behavioural control is positively related to green-product purchase intention.

2.2 Perceived Policy Effectiveness (PPE)

Government policy serves as a motivational device for changing people's behaviour through tools and several promising strategies [17]. PPE is defined as 'people's favourable or unfavourable perception of the effectiveness of government policy' [32]. In a study on pro-environmental behaviour, Stag and Vlek [36] proposed that it is crucial for researchers and policymakers to systematically assess the impact of policies and reveal the success of government policies in changing behaviour and reducing environmental impact. In a study on government policies for energy-saving household appliances, Zhang [37] concluded that consumers generally had a good understanding of government incentive policies, and a high proportion agreed that people should change their purchasing behaviour. Guo et al. [38] also indicated that subsidies from government policy could not only encourage firms' recycling activities but also impact consumers' preferences.

Recently, many countries have added carbon peaks to their national policies. For example, China announced at the general debate of the 75th United Nations General Assembly that it will adopt more effective policies and measures, strive for peak carbon dioxide emissions by 2030 and aim to achieve carbon neutrality by 2060. At the same time, the European Union proposed its 2030 Climate Target Plan [39], which aims to reduce greenhouse gas emissions by at least 55% by 2030 and sets Europe on a responsible path to becoming climate neutral by 2050. There is no doubt that government policy plays a vital role in developing a green economy in China [12, 40, 41]. This study

attempts to explore the impact of government policy regarding green products. For example, in recent years, the Chinese government has legislated specific energy-saving and low-emission targets to reduce carbon emissions. The State Council of the PRC [42, 43] has issued several documents on the identification system and incentive policy (e.g. subsidies on green vehicles) for green products to effectively achieve this highly challenging task. Publicity on the benefits and importance of green products has also been widely spread through the national media.

Governments and their policies have been considered in recent studies on green products [12, 13, 15, 40, 41, 44]–[46]. Young's [46] empirical study in the UK suggested that the government's incentive policies and green-product identification system can help consumers concentrate their limited resources to practice green consumption. Matin's [13] empirical study on the Georgian green-product market found that the effectiveness of government policies was positively related to customer attitude and purchase intention. Likewise, Tang [15] came to a similar conclusion. Thus, when people perceive that the policies related to green products are effective, it will enhance their willingness to purchase green products. In light of the above, the following hypothesis is posited:

H4: Perceived policy effectiveness is positively related to green-product purchase intention.

Government policy has been believed to be more than a direct determinant of specific behaviour. A study has proposed that the research on its moderating effect may contribute to the formulation of related policies [18]. Xu and Ling's [47] results indicated that PPE did have multiple moderating effects in the empirical research in which the TPB acts as the conceptual framework. Liu [40] suggested that government subsidies moderate the relationship between attitude and green smartphone purchase intention, which proved that the role of government policies play a role as a potential driving force for consumers' green-product purchase intentions [12, 40]. However, the moderating effect of government policy regarding the TPB constructs has not been thoroughly investigated.

In the field of recycling, Wan et al. [18] suggested that, if a government designs and implements effective policies designed to encourage recycling, the social influence would become less important because when an individual is strongly motivated by policy measures, the impact of social pressure and significant others would have less influence on their recycling intentions. Regarding green products, perceived policy effectiveness may play a similar role between the subjective norm and the purchase intention. Perceived government policy support for green products may weaken the influence of significant others on customers' purchase intentions.

A government's certification, labelling system and subsidy incentive policies for green products make purchasing green products more convenient and legitimate, thereby making it easier for consumers to identify and buy green products at preferential prices [44]. At the same time, the publicity for and explanation of green products in government policies are considered to potentially help consumers gain a deeper understanding of green products and to promote sustainable consumption [48]. Therefore, when the level of perceived behavioural control is the same, people with higher perceived policy effectiveness may develop stronger purchase intentions. In short, perceived policy effectiveness may strengthen the link between perceived behavioural control and purchase intention.

Considering the literature gap related to the moderating effect of perceived policy effectiveness regarding green products, the following research questions are proposed:

RQ1: How does the perceived policy effectiveness moderate the relationship between subjective norm and purchase intention?

RQ2: How does the perceived policy effectiveness moderate the relationship between perceived behavioural control and green product purchase intention?

2.3 Environmental Concern (EC)

Environmental concern refers to the awareness of the consequences of existing environmental problems and the willingness to contribute to it through their efforts [8, 49, 50]. Over the years, environmental concern has become an increasingly hot topic. It was found in many previous studies that individuals who were more concerned about the environment were more likely to show environmentally friendly behaviour [19, 20, 49, 51, 52]. Joshi [7] suggested that consumers' high concern for the environment is a major motive that drives their green-purchasing behaviour. Furthermore, many previous studies on EC have indicated that attitude mediates environmental concern on purchase intention, such as green electricity [49], renewable energy [19] and green products [15, 53].

In the research on green products, EC plays a more sophisticated role. Many previous empirical investigations have proven that EC is positively related to SN, PBC, ATT and PI [11, 14, 16, 24, 54]. As a result, EC plays a vital role in the theoretical framework of the TPB. However, Bamberg [21], whose study analysed the specific differences between students with high and low EC under the TPB theoretical model, indicated that future research should stop considering environmental concern as a direct determinant and see it rather as an important indirect determinant of specific behaviour. However, few prior studies have classified groups with different EC regarding green products e.g. [23]. Albayrak [23] made a preliminary conclusion that people with different EC have differences in SN, PBC, and ATT towards green-product purchase intention, which laid an empirical foundation for future research. Thus, I posit the following research question:

RQ3: How do people with different environmental concern influence their green-product purchase intention?

3 Research Method

3.1 Method

AN online survey was conducted to examine the application of the extended TPB to analyse people's green-product purchase behaviours. The questionnaire was written in English and translated into Mandarin. To ensure the quality of translations, all translated questions were back-translated and checked against the English counterpart. This survey was conducted in China, and using Mandarin allowed the research to be more applicable to the local language environment. Data collection took place between 21 April 2022 and 28 April 2022. A total of 501 completed survey questionnaires were received: 73 responses were excluded from the analysis because they failed to pass the filter test for

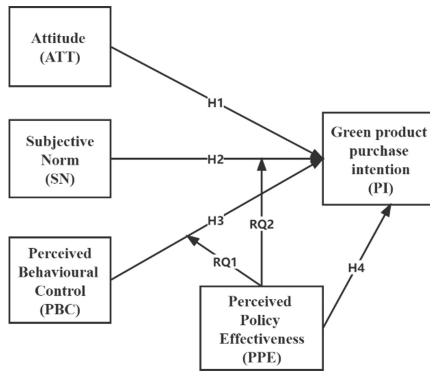


Fig. 1. The conceptual framework.

this questionnaire. Finally, 428 valid questionnaires were collected for a response rate of 85.43%. The sampling strategy was snowball sampling with no mandatory restrictions since consumers can freely buy green products. The commercial website Sojup was used to help send and collect data (Fig. 1).

3.2 Sample

The breakdown of respondents' ages, gender, incomes and educational levels reflected that of the national population with a slight deviation. Of all 428 participants who met the criteria for the questionnaire, 55.1% were male, and 44.9% were female. The proportion of men was 4% higher than the national average. Participants' ages ranged from 12 to 76, and the median age was 41.0 years ($M = 40.52$, $SD = 11.027$), slightly higher than the nation's median age of 38.4 years. Median monthly household income was ¥15000 to ¥20000. Median educational level was a university degree, with most participants attaining a diploma.

3.3 Measures

Environmental concern. To measure respondents' awareness of the environmental issues, participants responded to four 7-point Likert scale items (1 = strongly disagree, 7 = strongly agree). Items were adapted from past studies [51, 52]. A higher score represents greater environmental concern ($M = 6.67$, $SD = .65$, Cronbach's $\alpha = .95$).

Attitude. Six items from a study on the TPB [55] were adopted by using a 7-point Likert scale (-3 to +3), which assessed participants' beliefs that purchasing green products is good, wise, beneficial, favourable, positive, satisfactory (1 = strongly disagree; 7 = strongly agree; $M = 6.45$, $SD = .90$, Cronbach's $\alpha = .95$).

Subjective norm. Four items from Armitage [55] were modified to measure the influence of significant others on individuals. The statements were derived from four items: 'People who are important to me think I ...'; 'People who are important to me would...'; 'People who are important to me want me to...'; and 'People who influence

my behaviour would...' purchasing green products (1 = strongly disagree; 7 = strongly agree; $M = 5.86$, $SD = 1.13$, Cronbach's $\alpha = .96$).

Perceived behavioural control. Three items from Armitage [55] and Ajzen [22, 25] were modified to measure the degree of ease or difficulty with which an individual believes he/she can control and perform a behaviour. Respondents indicated their agreement (1 = strongly disagree, 7 = strongly agree) with the following three statements: 'I am capable of...'; 'If it were entirely up to me, I am confident that I would...' purchasing green products and 'Purchasing green products are entirely within my control'. ($M = 5.89$, $SD = 1.06$, Cronbach's $\alpha = .88$).

Perceived Policy Effectiveness. Participants responded to five 7-point Likert scale items measuring their favourable or unfavourable perception of a specific policy measure. Items were modified from past studies [32, 47]. A higher score represents participants having more positive feelings about what government policies provides in terms of effectiveness (1 = strongly disagree; 7 = strongly agree; $M = 5.47$, $SD = 1.33$, Cronbach's $\alpha = .96$).

Green product purchase intention. Intention to purchasing the green product was assessed using three items adopted by Armitage [55], each on a 7-point Likert scale. Respondents indicated their agreement (1 = strongly disagree, 7 = strongly agree) with the following three statements: 'I intend to...' 'I plan to...' and 'I want to...' purchasing green products. A higher score represents that the participant is more likely to buy green products ($M = 5.91$, $SD = 1.04$, Cronbach's $\alpha = .95$).

Control variables. The questionnaire includes age ($M = 40.52$, $SD = 11.03$), gender (1 = male, 2 = female; 55.1% males) and household monthly income level ($Mdn = 4$ or '¥15000 to ¥20000,' $SD = 1.44$).

Past purchasing behaviour. Three items using a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree) were modified from past studies [11, 56] to evaluate participants' past green-product purchasing behaviour ($M = 6.11$, $SD = 1.03$, Cronbach's $\alpha = .98$). This variable is included in the control variables.

3.4 Analytical Approach

The collected data were processed and exported in IBM SPSS version 26. Three different analyses of the research model were made: all-sample group, the high EC group and the low EC group. Hierarchical regression analysis was performed to examine the proposed conceptual model. There were four incrementally steps in the regression model. The four steps were (a) control variables; (b) TPB variables—ATT, SN, and PBC; (c) moderating variable—PPE and (d) interaction terms. This study computed the interaction terms by multiplying the centralized scores of PPE with the centralized score of PBC and SN.

4 Results

The correlations between all conceptual model variables were significant. The mean of all independent variables is relatively high, suggesting that most participants have a positive response towards buying green products. Moreover, the standard deviation of all variables is more than 1, which widens the sample range.

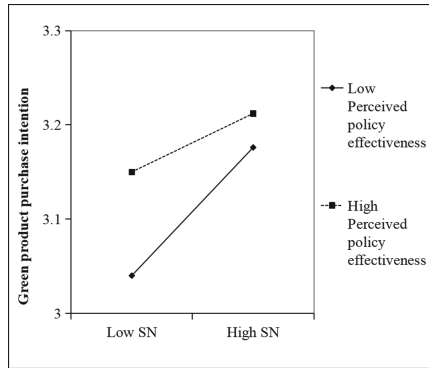


Fig. 2. Interaction between subjective norm and perceived policy effectiveness on green-product purchase intention (all-sample group).

Table 1 displays the hierarchical regression model predicting green-buying intention. Coefficients for the final model and R^2 change are reported in each step. In the all-sample group, gender, age and income were not significantly related to green-product purchase intention. Past purchasing behaviour was significantly related to green-product purchase intention ($\beta = .226$, $p < .001$). The demographic variables accounted for 38.7% of the green-product purchase intention variance. Regarding the TPB variables, SN ($\beta = .314$, $p < .001$), PBC ($\beta = .221$, $p < .001$) and ATT ($\beta = .148$, $p < .001$) were all positively associated with green-product purchase intention, supporting H1, H2 and H3. The TPB block explained 28.5% of the variance in green-product purchase intention. Next, PPE ($\beta = .094$, $p < 0.05$) was positively related to green-product purchase intention, supporting H4. Block 3 explained 0.5% of the variance in green-product purchase intention. Finally, the interaction effects between SN and PPE on the intention to purchase green products were significantly negative ($\beta = -.074$, $p < .05$), indicating that the relationship between SN and green-product purchase intention is significantly weakened when PPE is high in comparison to when it is low. Figure 2 shows the regression of green-product purchase intention on SN at two levels of PPE. SN had a stronger positive effect on green-product purchase intention when PPE was low, which answered RQ2. However, the interaction between PPE and PBC was not significant, rejecting RQ1. Block 4 explained 0.6% of the variance in green-product purchase intention. The overall regression model accounted for 68.3% of the green-product purchase intention variance.

For RQ3, participants were divided into two groups according to the mean of EC ($M = 6.67056$). Group 1 showed high environmental concern and group 2 had a relatively low environmental concern.

Regarding the high EC group, age ($\beta = .072$, $p < .05$) and past purchasing behaviour ($\beta = .242$, $p < .001$) were positively related to green-product purchase intention among all control variables. Gender and income were not significantly related to green-product purchase intention. The demographic variables accounted for 37.4% of the variance in green product purchase intention. Regarding the TPB variables, ATT ($\beta = .199$, $p < .001$), SN ($\beta = .280$, $p < .001$), and PBC ($\beta = .230$, $p < .001$) were positively related to green product purchase intention, supporting H1, H2 and H3. The TPB block

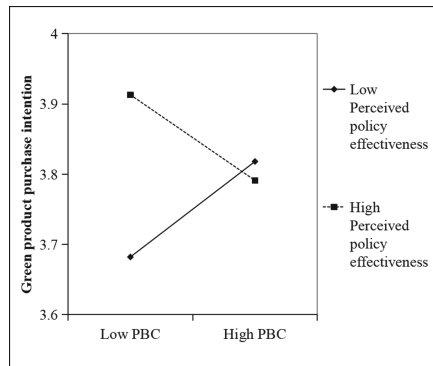


Fig. 3. Interaction between perceived policy effectiveness and perceived behavioural control on green-product purchase intention (low EC group).

explained 25.1% of the variance in green-product purchase intention. For block 3, PPE was not significantly related to green product purchase intention, rejecting H4. Block 3 explained 0.3% of the variance in green-product purchase intention. In block 4, however, the interaction of PPE and SN, and the interaction of PPE and PBC were not significant. RQ1 and RQ2 were not answered. Block 4 explained 0.4% of the variance in green-product purchase intention. The overall regression model accounted for 63.2% of the variance in green-product purchase intention.

Regarding the low EC group, coefficients for the final model and R2 change for each step were reported. Among all control variables, past purchasing behaviour is significantly related to green-product purchase intention ($\beta = .225, p < .01$). Gender, age, and income were not significantly related to green product purchase intention. The demographic variables accounted for 24.80% of the variance in green-product purchase intention. Regarding the TPB variables, SN was significantly related to green-product purchase intention ($\beta = .080, p < 0.05$), supporting H2. However, ATT and PBC were not significantly related to green-product purchase intention. H1 and H3 were not supported. The TPB block explained 42.9% of the variance in green-product purchase intention. In block 3, PPE was not significantly related to green-product purchase intention, rejecting H4. Block 3 explained 1.6% of the variance in green-product purchase intention. In block 4, the interaction effects between PBC and PPE on intention to purchase green products were significantly negative ($\beta = -.239, p < .05$), indicating that the relationship between PBC and intention to purchase green products is significantly weakened when PPE is high in comparison to when PPE is low, which answered RQ1. However, contrary to previous expectations, PPE negatively moderated the relation between PBC and green-product purchase intention. Figure 3 depicts the regression of green-product purchase intention on PBC at two levels of PPE. The figure shows that the relationship between PBC and green-product purchasing was stronger for those who believe government policies are not effective than for those who believe government policies are effective. Block 4 explained 1.7% of the variance in green-product purchase intention. The overall regression model accounted for 70.9% of the variance in green-purchasing intention.

Table 1. Hierarchical multiple regression predicting green-buying intention

Groups	All	High EC	Low EC
Variable	β	β	β
Block 1: Demographics			
Gender (1 = male, 2 = female)	.054	.051	.058
Age	.032	.072*	-.016
Income	.023	.008	.061
Past purchasing behaviour	.226***	.242***	.225**
ΔR^2 (%)	38.7***	37.4***	24.8***
Block 2: TPB variables			
Attitude	.148***	.199***	.080
Subjective norm	.314***	.280***	.432*
Perceived behaviour control	.221***	.230***	.062
ΔR^2 (%)	28.5***	25.1***	42.9***
Block 3: PPE			
Perceived policy effectiveness	.094*	.073	.123
ΔR^2 (%)	.5***	.3***	1.6***
Block 4: Interaction			
PPE \times PBC	-.021	.025	-.239*
PPE \times SN	-.074*	-.073	.051
ΔR^2 (%)	.6***	.4***	1.7***
Total R^2 (%)	68.3***	63.2***	70.9***

Note: PPE, SN and PBC are centralized before putting them into regression

* $p < .05$. ** $p < .01$. *** $p < .001$.

5 Discussion

The present study contributes to existing research by investigating individuals' different levels of EC while TPB variables and PPE are introduced to examine what motivates green-product purchase intention and the moderating effect of PPE on SN and PBC. Results indicate that ATT, PBC and SN were positively associated with green product purchase intention in the high EC group and the all-sample group. However, PBC and attitude were not significant in the low EC group. PPE is positively related only to green-product purchase intention in the all-sample group. Furthermore, the all-sample group suggests that PPE negatively moderated the influence of SN on green-product purchase intention, which is consistent with Wan's [18] research but fails to moderate the relation of PBC with green-product purchase intention. A possible explanation is that high PPE does not represent policy acceptability. Steg et al. [57] suggested that the relationship between acceptability and PPE is not straightforward. Previous studies [7, 28, 40, 58, 59]

indicated that the perceived high price of green products was the most frequently noted barrier. When the cost of a green product is higher than that of a traditional product, people tend to buy the traditional product. Thus, since the price of green products is still relatively high, even with effective policy incentives, people with the same PBC may not have a higher intention of purchasing the green product. In addition, Steg [57] pointed out that perceived effectiveness is not necessarily related to the actual effectiveness of policies. People can easily be wrong about what actually would be effective. In many cases, they do not have any detailed understanding of such policies and, consequently, do not know the possible environmental impact of them, which may be another major reason for this result.

Overall, this study supported the TPB in predicting green-product purchase intention. The result of the all-sample group is consistent with the findings of previous studies [6, 7, 14, 18, 24, 54]. ATT, SN, PBC and PPE positively predicted green-product purchase intention, and PPE negatively moderated the SN. These results indicate that consumers are more likely to engage in green-product purchasing if consumers are supported by significant others, have a positive attitude or feel that buying a green product is within their control, or have a favourable perception of the effectiveness of government policy.

Regarding the high EC group, ATT ($\beta = .199$), SN ($\beta = .280$) and PBC ($\beta = .230$) all play a vital role in green-product purchase intention. ATT ($\beta = .199$) is significantly higher than the overall sample ($\beta = .148$), which means the attitudes of people with high EC are more positively related to purchase intention. Furthermore, PPE was not significant to PI and PPE has no moderating effect, which means the purchasing intention of people with high environmental concern will not change due to the effectiveness of the policy. A possible explanation is that their intention arises more from spontaneous personal factors, and whether there are effective policies or not does not directly or indirectly alter their intention to buy green products. They are willing to pay a premium for products that are environmentally protective [19, 60].

Interestingly, in the low EC group, ATT, PBC, and PPE were not significant to PI, while SN ($\beta = .432$) played a major role in PI, which is consistent with Bamberg's research [21]. This result means that the intention of people with low EC is determined mainly by social-norm-related cognitions. Without the support of significant others and stress from social pressure, the low EC group is less likely to have intentions to purchase green products. The insignificance of ATT and PBC may be due to people with low EC still following the traditional consumption pattern. Even if they have a high ATT towards green products and a high PBC, they will not have a higher intention to buy green products. Furthermore, PPE failed to moderate the SN's influence on green-product purchase intention and negatively moderated the relation between PBC and green-product purchase intention. At the same time, PPE was not significant to PI. Bang's study [19] suggested that the consumer's EC is more emotionally charged than fact- or knowledge-based. Low EC individuals who retain their traditional habits and patterns of consumption may be more persistent in the original pattern. Thus, the perceived effectiveness of the policy will not promote their intention to purchase green products, nor will it have any impact on SN. Their commitment to traditional consumption habits may also explain why PPE can even negatively moderates PBC.

6 Conclusions

This study makes several theoretical contributions. First, it examines the moderating role of perceived policy effectiveness within the TPB framework. In particular, findings from this study suggest that PPE has a negative moderating effect on the SN. Relevant policymakers should take this finding into consideration. Second, previous studies [11, 14, 16, 24, 54] focussed mainly on the direct effect on green-product purchase intention, while fewer studies [21, 23] have attempted to group people with different levels of environmental concern to understand its potential indirect influence. The present study has shed light on the differences between people with high vs. low EC, which provides a comprehensive understanding of the role of environmental concern in the TPB framework. Specifically, people with high EC will spontaneously prefer to buy green products and will not be affected by government policies, while people with low EC will not increase their intention to buy green products even when they perceive that the policy is effective. Their intention to buy green products is largely determined by the social pressure caused by the subjective norm. Additionally, consistent with previous studies [11, 16, 24, 27], the present research once again supported that the TPB has high explanatory power in this field.

In terms of the practical implications, this study's findings have great significance to policymakers who want to increase consumers' willingness to purchase green products. Specifically, compared with the effectiveness of policies, the government should pay more attention to people's environmental concerns to improve their spontaneity towards purchasing green products.

The study has several limitations. First, the samples and policies studied in the study are from China, which may lead to potential cultural limitations. Future research should improve the study's sampling method by extending research to different countries to narrow the literature gap. Second, purchasing intention is a subjective measure that may not truly reflect consumers' actual purchasing behaviours. The attitude-behaviour gap is an essential concern in the field of green products. Although previous studies offer some evidence and enlightenment are given by previous studies [61, 62], future research should examine how behavioural intention is translated into actual green-product purchase behaviours. Third, this study did not examine whether policy features (e.g. pull or push measures) and individual factors would affect the perceived effectiveness of the policy. Future studies should conduct further research and extend the discussion in this regard. Fourthly, this study did not explore the relationship between environmental concern and environmental knowledge, which may be of great importance to improve the intention of green-product consumption [19, 24, 48, 54].

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