

Research on Consumption Behavior of Green Household Appliances under the Background of Carbon Neutrality

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Abstract. With the gradual implementation of China's "Carbon Neutral" policy, the concept of green consumption has gradually penetrated into consumers' daily life, and innovative green household appliances have emerged one after another, affecting consumers' green purchase behavior. Based on this, this paper conducts an empirical analysis from the perspective of consumer psychological mechanism, government behavior, green purchase intention and behavior. The results are as follows: green purchase intention is significantly and positively affected by consumer innovation and the effectiveness of cognitive behavior, as well as by the government environment. Besides, Green purchase intention plays an intermediary role between policy environment and green purchase behavior.

Keywords: Carbon Neutrality; Green Household Appliances; Green Purchase Intention; Green Purchase behavior.

1. Introduction

Since the goal of "Carbon Neutrality" was put forward, the research on realizing carbon neutrality and China's low carbon economic and social construction has been increasing day by day, and the problems such as realization methods and construction approaches have been discussed. As an important part of the current "Carbon Neutral" green development strategy, green purchasing behavior has gradually become a concept in the research and discussion of scholars from all walks of life. However, many scholars have focused on the relationship between green purchase intention and green purchase behavior, while few have studied the factors affecting green purchase intention. In view of this, this paper will describe the variables that affect green purchase intention from the perspective of consumers, governments and enterprises, build a relationship model between the factors that affect green purchase intention and green purchase behavior, think about the key factors that affect green purchase behavior, and finally put forward relevant suggestions to consumers, governments and enterprises to gradually implement the "Carbon Neutral" policy.

2. Literature Review

Cai Aili and others pointed out that green household appliances refer to household appliances whose relevant indicators are controlled within the scope of environmental protection standards [1]. For example, energy-saving air conditioners, green refrigerators, etc., these household appliances will no longer use "Fluoride" to maintain operation during operation, and will be in a long-term "Fluoride free" consumption state. At the same time, Lin Boqiang and others understand it as that the pollution generated when using this type of household appliances is very small [2].

Green consumption means that consumers take the initiative to buy green household appliances that are conducive to maintaining the current green ecological environment in order to assume the responsibility of protecting the ecological environment. The definition of green consumption was first proposed by the British scientists Elkington and Julia Harris. They believe that green consumption is a moderate consumption behavior with the characteristics of saving resources, maintaining the environment and respecting nature.

Currently, green consumption has become the active choice of consumers, and green consumption and green consumption intention are interrelated. Green purchase behavior is actually developed from purchase intention, in which purchase intention is a key variable in the research of planning and behavior theory, emphasizing a subjective tendency. In the empirical research, green shopping intention is generally used to explain the green purchase of consumers, which also makes more and more scholars join in the study of green consumption intention. Through the analysis and collation of relevant literature, it is found that some scholars pointed out that the factors affecting green purchase intention are mainly manifested in two aspects: one is based on the psychological mechanism of consumers, and the second is based on social environmental factors. Their attitude has a significant positive effect on their willingness to buy green appliances, while their environmental perception behavior control has a significant positive effect on their willingness to buy green appliances. Dong Jihan believes that the sense of environmental responsibility has an obvious positive effect on the purchase intention of green household appliances [3]. This article will also look into the factors that affect consumers' green purchase intention from two perspectives, respectively consumer psychological mechanism and government behavior.

Green purchasing behavior is to choose green goods or sustainable green goods, and to actively resist those products that are harmful to the environment in operation. The variable of purchase behavior originates from TPB, theory of planned behavior. With the gradual enhancement of consumers' concept of green consumption, it can affect consumers' purchase behavior, which gradually extends the concept of "Green Purchase Behavior", which was first proposed in 1999. Some scholars have studied that attitudes positively affect green purchase behavior. It can be seen that green purchase behavior can become a result variable of green consumption willingness, so this paper will study green purchase behavior as a result variable.

The government policy environment is an indispensable force to promote green and low-carbon consumption. The subsidy policy plays a major role, which directly affects consumers' green consumption willingness and indirectly affects consumers' green purchase behavior. Shen Manhong and others pointed out that subsidies for green goods are a major fiscal and tax means for the government to reduce carbon emissions, and can also increase consumers' interest in green goods [4]. At the same time, the government should implement compensation policies for consumers who buy green products to reduce prices and improve satisfaction [5]. Based on this, this paper measures green purchase intention by taking policy environment and subsidy policies as two variables.

In previous studies, many scholars have studied green purchase intention and green purchase behavior. Li Xiaohua and others said that stimulating the activity of the green consumer market can promote the development of the green economy [6]. But Liu Ziyao believed that the current green consumer market still lacked some activity, that is, consumers did not focus on buying green products when making purchase decisions [7]. Wang Chenggai pointed out that in recent years, the government has continuously introduced green policies, and the concept of green consumption will gradually penetrate into consumers' purchase behavior. In relevant research, however, there is no specific variable for consumer psychology, so this paper adds variables such as consumer psychology mechanism to further study the factors affecting green purchase intention. Based on this, this paper will focus on the influencing factors of green purchase intention from two aspects of consumers and the government, and explore the extent to which green purchase intention plays a role in green purchase behavior, so as to increase green consumption publicity methods and improve consumers' green purchase intention and behavior.

3. Research Hypothesis

From the perspective of consumer psychological mechanism, there are mainly two variables: "Perceived Behavioral Effectiveness" and "Consumer Innovation". Perceived Behavioral Effectiveness mainly refers to the degree of psychological perception that consumers believe their personal consumption behavior has an impact on the social ecological environment. It is the

effectiveness and confidence that consumers can solve the ecological environment problems through their own consumption behavior. Consumer innovation, in essence, is a kind of innovation in the human heart, which originates from a certain spiritual trait in people's hearts. These characteristics can promote people to consciously choose new goods. Compared with those customers who are more conservative, they are also more willing to explore new things. Some experts define consumer innovation ability as perceived innovation ability and perceived innovation ability. The research conclusion shows that these two dimensions have a significant impact on the purchase intention of new products, and cognitive innovation has a greater impact. Therefore, this paper proposes the following assumptions:

H1: Perceived behavioral effectiveness positively affects green purchase intention.

H2: Consumer innovation positively affects green purchase intention.

"Policy Environment" refers to the strength of policies and regulations issued by the government in terms of consumption and relevant incentive publicity means. The external incentive policy, as the main external situational factor of government intervention in consumers' green purchase behavior, will inevitably play a positive role in the formation of consumers' green purchase intention and purchase behavior. Among them, "Policy Subsidy" can promote consumers to choose more green products. Therefore, this paper proposes the following assumptions:

H3: Policy environment positively affects green purchase intention.

H4: Policy subsidy positively affects green purchase intention.

The purchase intention is the basis of the purchase behavior. When the purchase intention is strong enough, the final purchase behavior can be generated. Through the understanding of green products and the role of relevant factors, consumers' green purchase intentions under the actual situation will eventually lead to the formation of green purchasing behavior. Many data have confirmed that there are the same changes between "Green Purchase Intention" and "Green Purchase Behavior", that is, they have a strong correlation. Based on a large number of literatures, there is no lack of research on the direct relationship between green purchase intention and green purchase behavior, but there is a lack of research on the intermediary between green purchase intention and policy environment and green purchase behavior. Therefore, this paper proposes the following assumptions:

H5: Green purchase intention positively affects green purchase behavior;

H6: Green purchase intention plays an intermediary role between policy environment and green purchase behavior.

4. Research Design and Methodology

4.1 Data Collection

This research mainly obtains data through offline distribution of paper questionnaires and online distribution of electronic questionnaires. The questionnaire consists of two parts. The first part is the demographic data part, and the second part is the Richter 5-level scale part, specifically including the measurement of consumer level, social environment level, green purchase intention and green purchase behavior variables. 150 questionnaires were randomly distributed through offline and online channels, 144 were recovered, 26 invalid questionnaires were screened, 118 valid questionnaires were recovered, and the effective recovery rate was 78.6%.

4.2 Sample Statistics

The basic information of the questionnaire is as follows: among the respondents, 61.9% are women and 38.1% are men. In terms of age, the majority of respondents are 22-35 years old, with 42.9% aged 18-25, 39.3% aged 26-35, accounting for 82.2% of the total, and 17.8% aged 36 and over. From the perspective of monthly household disposable income, 4500-6000 yuan and below accounted for the largest proportion, 65.2%, 6001-10000-yuan accounts for 27.20%, and the proportion above 10000 yuan is 7.60%.

4.3 Reliability and Validity Examination

The questionnaire used in this paper has 6 variables and 20 measurement items, all of which are analyzed by software SPSS26.0. The reliability and validity examination results of the scale are shown in Table 1. The analysis results show that Cronbach's except for the green purchase intention variable α 0.712, Cronbach's of each other variable α are all above 0.8, indicating that the scale has good structural stability.

Table 1. Variable Summary

Variable	Sample Size	Item Quantity	Cronbach Alpha
Green Purchase Intention (GPB)	118	3	0.838
Green Purchase Intention (GPI)	118	2	0.712
Consumer Innovation (CI)	118	4	0.840
Perceived Behavioral Effectiveness (PBE)	118	4	0.843
Policy Environment (PE)	118	4	0.841
Policy Subsidy (PS)	118	3	0.850

5. Empirical Analysis

5.1 Correlation Analysis

From the consumer, there is a strong positive correlation between green purchase intention and consumer innovation, perceived behavior effectiveness. From the social environment, there is a strong positive correlation between green purchase intention and government environment and subsidy policies, as shown in Table 2.

Table 2. Correlation Analysis

	GPB	GPI	PBE	CI	PE	PS
GPB	1					
GPI	0.804**	1				
PBE	0.627**	0.640**	1			
CI	0.455**	0.578**	0.571**	1		
PE	0.473**	0.551**	0.635**	0.635**	1	
PS	0.657**	0.715**	0.678**	0.715**	0.627**	1

**At 0.01 level, the correlation is significant

5.2 Regressive Analysis

Table 3. Multivariate Regression Analysis of GZ and CX, BT and HJ to Green Purchase Intention

Mod.		Unstandardized Coefficients		Standardization coefficients β	T	P
		B	Standard error			
1	Constant	0.719	0.339		2.123	0.036
	PBE	0.540	0.096	0.460	5.599	0.000
	CI	0.311	0.081	0.315	3.837	0.000
2	Constant	0.553	0.319		1.733	0.086
	PE	0.702	0.095	0.610	7.417	0.000
	PS	0.181	0.088	0.169	2.05	0.043

It can be seen from Table 3 that in Model 1, the coefficient between green purchase intention and perceived behavior effectiveness is 0.460, and at the level of 0.001, green purchase intention is significantly positively affected by perceived behavior effectiveness, so H1 is valid. The coefficient between green purchase intention and consumer innovation is 0.315, and at the level of 0.001, green purchase intention is significantly positively affected by consumer innovation, so H2 is established. The coefficient between green purchase intention and policy environment is 0.610, and at the level

of 0.001, green purchase intention is significantly positively affected by policy environment, so H3 is established. The coefficient between green purchase intention and subsidy policy is 0.169, P is $0.043 > 0.001$, but $0.043 < 0.05$, so green consumption intention is significantly positively affected by subsidy policy at 0.05 level, so H4 is established. The regression equation is as follows:

$$GPI = 0.540 * PBE + 0.311 * CI + 0.719 \dots$$

$$GPI = 0.702 * PE + 0.181 * PS + 0.553 \dots$$

Table 4. Regression Analysis of Green Purchase Intention to XW

Mod.	Unstandardized Coefficients		Standardization coefficients β	T	P
	B	Standard error			
4	Constant	1.067	0.214	4.983	0.036
	GPI	0.752	0.052	0.804	14.549

It can be seen from Table 4 that the coefficient between green purchase behavior and green purchase intention is 0.804, and at the level of 0.001, green purchase behavior is significantly positively affected by green purchase intention, so H5 is established, and the regression equation is as follows:

$$GPB = 0.752 * GPI + 1.067 \dots$$

5.3 Intermediary Effect Examination

This part exams the intermediary effect of green purchase intention in policy environment and green purchase behavior. Set Bootstrap to sample 5000 times, build a 95% confidence interval, and calculate the indirect effect under the intermediary conditions. The intermediary effect examination results are shown in Table 5 and Table 6.

Table 5. Intermediary Effect of Green Purchase Intention

Mod.		Standardization coefficients b	SE	95% Confidence Interval		R^2	F
				LLCI	ULCI		
GPI	Constant	0.7868	0.3022	0.1882	1.3855	0.5116	121.4916***
	PE	0.8239	0.0748	0.6759	0.9720		
GPB	Constant	0.8124	0.2437	0.3188	1.2841	0.6599	111.5751***
	GPI	0.6386	0.0838	0.0159	0.3479		
	PE	0.1819	0.0728	0.4945	0.7827		

**At 0.01 level, the results are significant

Table 6. Intermediary Effect Examination of Green Purchase Intention

	Effect	Boot SE	T	P	95% Confidence Interval	
					LLCI	ULCI
Total Effect	0.7081	0.0754	9.3950***	0.0000	0.5588	0.8573
Direct Effect	0.1819	0.0838	2.1707*	0.0320	0.0159	0.3479
Indirect Effect	0.5261	0.0853			0.3471	0.6855

**At 0.01 level, the results are significant

It can be seen from Table 6 that the effect value of policy environment→green purchase intention→green purchase behavior path is 0.7081, and the 95% confidence interval is [0.5588, 0.8573], excluding 0, indicating that the intermediary effect of green purchase intention is significant, so H6 is established. Therefore, green purchase intention is an intermediary between policy environment and green purchase behavior.

6. Research Conclusion and Enlightenment

6.1 Research Conclusion

In order to explore the relationship between consumer psychological mechanism and government behavior and green purchase intention and behavior, this paper puts forward six hypotheses, and conducts hypothesis testing through empirical analysis, and finally concludes that the hypotheses H1-H6 are valid.

Firstly, green purchase intention is significantly and positively affected by consumer innovation and perceived behavior effectiveness. Because green products will have a strong appeal to consumers. Based on the yearning for "innovation" and the pursuit of a green living environment, consumers are likely to form an independent green purchase intention and thus make green purchase behavior.

Furthermore, green purchase intention is significantly and positively affected by policy environment and subsidy policy. As the government gradually attaches importance to subsidies for green household appliances, consumers are gradually willing to buy green household appliances. Government subsidies for such products not only enable consumers to make contributions to environmental protection to a certain extent, but also enhance consumers' satisfaction in participating in environmental protection and strengthen the deepening of the concept of green consumption.

Besides, green purchase intention positively affects green purchase behavior. Many scholars have verified this hypothesis for many times, and this paper also verified this hypothesis again. For the green purchase behavior variables, the focus is to analyze which factors will directly affect the green purchase intention, and then gradually analyze which factors can indirectly affect the green purchase behavior.

Lastly, green purchase intention plays an important intermediary role between policy environment and green purchase behavior. The policy environment can ultimately influence consumers' green purchase behavior with the help of green purchase intention. If the policy environment is strong, it is likely to enhance consumers' green purchase intention, which in turn positively affects green purchase behavior. With the increase of green purchase intention, the green purchase behavior of consumers will also be enhanced, and the changes between the two show consistent characteristics.

6.2 Research Enlightenment

Based on the above empirical analysis, this paper believes that consumers' psychological mechanism and social environment will comprehensively affect consumers' willingness and behavior to purchase green appliances.

For consumers, on the one hand, we should actively strengthen the innovative consumption concept, actively participate in green practice, actively strengthen our low-carbon environmental protection, and actively participate in green practice. On the other hand, we should also constantly cultivate our green perception, actively adapt to the current policy environment, and gradually improve the green consumption concept and green living habits. When purchasing household appliances, we should consider various factors and consciously invest in green consumption. We, meanwhile, should actively understand the relevant information of green products, learn the relevant knowledge of green consumption and the function of green products, and recognize the role of green production in reducing environmental pollution, reducing resource waste and protecting the body.

For the government, On the one hand, we should recognize the key role of green purchase intention on green purchase behavior, and focus on how to stimulate consumers' green purchase intention. On the other hand, we should also improve the laws and regulations on green consumption, and strengthen and implement subsidies and policies. Recently, the government is not perfect in green consumption laws, the level of green market legal construction is still low, and green policy publicity is not in place. The government departments should pay attention to the interpretation of the policy, let consumers understand the policy and enjoy the benefits brought by the policy, constantly increase publicity and guidance, implement subsidy measures, and launch corresponding measures to promote consumption, especially for household appliances and other people's livelihood goods with relatively

high customer price, stimulate consumption through shopping vouchers and other ways to accelerate the economic cycle.

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References

- [1] Cai Aili. Research on Consumers' Green Consumption Behavior in the Network Environment--Taking Green Household Appliances as an Example [J]. Jiangsu Higher Vocational Education, 2021, 21(01): 65-70+77.
- [2] Lin Boqiang, Zhan Yanhong, Sun Chuanwang. A Study of the Coordinated Development of Energy Supplies and the Demand for Carbon Neutrality [J]. Governance Studies, 2022, 38(03): 24-34+125.
- [3] Dong Jihan, Wang Zihan, Zhang Xinshuo, et al. Research on consumers' willingness to purchase green appliances [J]. Modern Business Trade Industry, 2020, 41(23): 50-51.
- [4] Shen Manhong, He Zhenchuan. The Experience of Foreign Fiscal Policy on Low-Carbon Economy [J]. Ecological Economy, 2011(03): 83-89.
- [5] Jin Ming, Zheng Shaofeng. Analysis of Game Behavior in China's Green Agricultural Product Market [J]. Finance & Trade Economics, 2006(06): 38-41.
- [6] Li Xiaohua, Shao Juping, Sun Yanan. Research on the Stimulation of Green and Low-Carbon Product Consumption Market Vitality: An Evolutionary Game Based on Green Household Appliances [J]. Ecological Economy, 2021,37(1):27-34.
- [7] Liu Ziyao, Hu Ruochi. Study on the Influencing Factors of Consumers' Green Consumption Behavior: From the E-Commerce Environment Perspective [J]. Ecological Economy, 2022,38(8):60-67.
- [8] An Qi. Discussion on the Promotion Strategy of Chinese Residents' Green Consumption from the Perspective of Double Carbon Goal [J]. Journal of Commercial Economics, 2022(6):62-65.