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The Impact of Green Information on the Participation Intention of Consumers in Online Recycling: An Experimental Study

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Abstract: The rapid growth of electronic waste around the world has led to increased recycling problems. With the development of information technology, e-commerce has become a new trend in electronic waste recycling. This research designs two experiments to study the effect mechanism of green information on participation intention (PI) for online recycling websites. We found that providing green information can increase the PI of consumers, including environmental knowledge of product recycling (EKPR) and environmental corporate social responsibility (ECSR). Green perceived value (GPV) and green trust (GT) play mediating roles on the impact of green information on PI. In addition, the recycling platform reputation (RPR) plays a moderating role in the effect of ECSR on GT. Theoretical and managerial implications, along with avenues for future research, are discussed.

Keywords: online recycling; participation intention; green information; stimulus-organism-response model; platform reputation

1. Introduction

In recent years, the amount of electronic wastes in the world has been rapidly increasing, and informal Waste Electrical and Electronic Equipment (WEEE) collectors have been progressively withdrawing. Traditional offline WEEE recycling is facing great challenges [1]. In the new round of scientific revolution and industrial transformation, the online recycling model has provided new development opportunities for electronic wastes recycling. Online recycling generally refers to the mode of recycling whereby residents use an Internet recycling platform to recycle their recoverable waste [2], which incorporates the concepts of the Internet, technology, and the mode of recycling into the overall process of resource recovery [3]. Under this model, government-authorized formal recycling companies can communicate with consumers through an Internet platform to perform recycling transactions [4]. As the country producing the world's second-largest amount of electronic product production and waste, China faces an even more serious problem with e-waste. In China, e-waste is growing by 18% per year, with the generation of >6 million tons per year [5]. Since 2015, the Chinese government has issued several policies to support the development of the online recycling model. A number of online recycling platforms such as Aihuishou and Yizaisheng have been established in recent years in China. Despite the fanfare of online recycling, consumer participation has not been ideal. Taking mobile phones as an example, the research shows that despite the increased number of recycling channels, nearly 80% of residents choose to leave their scrapped mobile phones at home [6].

Electronic waste contains the electronic components, accessories, and materials that are eliminated or will not be reused by users [7,8]. On the one hand, e-waste contains a wealth of metals, such as gold,

silver, and cobalt. On the other hand, it also contains a large amount of toxic and harmful substances. Improper handling results in wasted resources and irreversible damage to the environment. Recycling municipal household waste effectively is an important factor in reducing environmental pollution and conserving resources [3]. Therefore, motivating consumers' intentions to participate in online recycling, and prompting them to dispose of electronic waste properly, has become an essential and urgent task to improve the recycling level of electronic waste and alleviate the dual constraints on China's resources and environment.

Previous research on consumers' recycling divides it into offline recycling and online recycling based on different recycling modes. Regarding the study of offline recycling, some scholars have expanded and integrated relevant research theories and models, including the theory of planned behavior (TPB), theory of reasoned action (TRA), technology acceptance model (TAM), and normative activation theory to study the influencing factors and mechanisms of consumers' participation in recycling behavior [9,10]. Others have designed a series of interventions, applying information, incentives, commitments, environmental changes, and other behavioral change strategies to increase consumers' willingness to participate in recycling [11]. Boonrod et al. (2015) found that after the introduction of separate economic incentives, Thailand's organic waste separation rate increased from 19% to 51% [12]. With the gradual rise of the online recycling mode, some scholars have begun research on online recycling. Research on consumers' participation in online recycling has only just started, focusing mainly on the discussion of the online recycling business model and the analysis of the influencing factors of consumers participating in online recycling. The former focuses on the development model, development connotation, recycling of business ecosystem, and recycling value [1,13–15], and the latter focuses on the factors affecting consumers' participation in online recycling while considering both psychological and contextual factors [2,4,16].

Overall, these studies provide a specific basis for research based on the influencing factors of consumers' participation in online recycling. However, there are few studies on intervention strategies to stimulate consumers' participation intention (PI) in online recycling, as they mainly focus on the research into offline recycling. It is necessary to study how to motivate consumers to participate in recycling in the context of the Internet. Among the online recycling interventions, environmental information promotion is considered to be an effective long-term strategy in many studies [17,18]. Ylä-Mella et al. (2015) argue that increased information and environmental awareness has increased public participation in recycling [19]. The online recycling mode involves recycling e-waste through an online app or a website submission of recycling demand. Will consumers be affected by the online promotion of green information while following offline recycling rules? Based on this consideration, this paper selects green information publicity as an intervention strategy for online recycling.

The particularity of the online recycling situation makes consumers consider more factors before making a recycling decision, and recycling platform reputation (RPR) is one of these factors. Greenwood et al. (2005) pointed out that reputation is more stable and sustainable than other moderating factors of trust [20]. In the context of the Internet, RPR may have a more significant regulatory effect on the trust of consumers. Therefore, this study introduces RPR as a moderating variable into the theoretical model to study whether RPR has a regulatory effect on the impact of green information on green trust (GT).

By using a stimulus-organism-response (SOR) to build the model, this paper introduces the green information and the RPR in the research on the PI of consumers to examine the regulating of the RPR involved in the relationship between green information and the PI. Additionally, the study provides feasible suggestions for promoting the development of the online recycling mode and improving the participation rate of consumers in the recycling platform.

The paper is organized as follows: Section 2 presents the theoretical basis and research hypothesis. In Section 3, the research methodology is introduced, including experimental materials, pre-experiment steps, and participants. Section 4 discusses the empirical analysis. Section 5 summarizes the main conclusions and discusses their implications for both research and practice. Finally, we show the limitation of this work and indicate the directions for future research.

2. Theoretical Basis and Research Hypothesis

2.1. Theoretical Basis

The theory of SOR is a classic theory that focuses on consumer behavior. Belk (1975) applied the SOR theory to the field of marketing research for the first time and proposed the SOR model [21]. The model proposes that when an individual receives a stimulus, it stimulates inner emotions and then the external behavioral response. This stimulus to response is not a mechanical connection, but instead is an individual's emotional perception, which plays a mediating role [22]. The SOR model has been widely used to study how environmental characteristics and stimuli affect users' mental states and user behavior [23,24]. Chen and Chang (2012) built a green marketing framework to verify that companies which operate electronic products can increase consumers' willingness to purchase by increasing consumers' green perceived value (GPV) and GT [25]. Online recycling is the inverse of this kind of purchasing behavior, and consumers' PI may therefore also be affected by GPV and GT. According to SOR, when consumers receive a stimulus from different green information during the process of online recycling, they will have a certain level of GPV and GT, which will influence their willingness to participate. As such, this study takes the SOR model as the theoretical basis and green information as the external stimulus to study whether green information affects consumers' GPV and GT and thus affects their PI.

2.2. Research Hypothesis

2.2.1. The Impact of Green Information on Consumers' PI

Information intervention could significantly influence recycling behavior [26]. As a kind of information intervention, green information refers to all typologies of environmental information that relate to e-waste recycling passed on to consumers [27]. Green information can be divided into written information and picture information based on its form, paper media information, and new media information according to the main body of communication, as well as product positioning, process positioning, image positioning, and environmental fact information based on content attributes [26,28,29]. Considering the particularity of the recycling situation, this study divides green information into two categories based on the information subject. The category relating to the mobile phone is called the environmental knowledge of product recycling (EKPR), and the other category relating to the mobile phone recyclers is called environmental corporate social responsibility (ECSR).

Environmental knowledge refers to "the ability of individuals to identify a range of signs, concepts, and behavioral patterns related to environmental protection" [30]. Numerous studies have confirmed that environmental knowledge is an important factor in personal environmental perception and behavior [31–34]. Some scholars believe that consumers can obtain environmental knowledge through various means in their lives, but the fields involved in such knowledge are not necessarily comprehensive [35]. The one-sidedness of knowledge may affect the correlation between environmental knowledge and individual environmental intention. Previous studies have also shown that environmental information based on specific contexts can influence consumers' behavior more than mass-distributed information [36,37]. Therefore, it is necessary to combine environmental knowledge with the promotion of environmental protection by recycling mobile phones, when encouraging consumers to participate in online recycling.

As an important subject in market transactions, the impact of corporate social responsibility (CSR) on consumers has been closely watched by scholars. CSR refers to companies deciding to "make policies based on social goals and values, and make decisions and actions" [38]. CSR can make consumers more willing to purchase a company's products [39]. Mohr and Webb (2005) further divide CSR into environmental responsibility and charity responsibility [40], and believe that environmental responsibility has a positive impact on consumers' willingness to purchase [41,42].

Since this paper mainly studies the impact of green information on consumer decisions participate in online recycling, the research focuses on environmental responsibility. Hence, this research proposes the following hypothesis:

H1a. *The EKPR provided by an online recycling platform is positively related to consumers' PI.*

H1b. *The ECSR provided by an online recycling platform is positively related to consumers' PI.*

2.2.2. The Impact of Green Information on GPV and GT

GPV is "a consumer's overall appraisal of the net benefit of a product or service between what is received and what is given based on the consumer's environmental desires, sustainable expectations, and green needs" [43]. Previous studies have shown that consumers' acquisition of relevant environmental knowledge can effectively enhance their perceived value of green products and services [44]. It can be seen that GPV as a constructive perception of consumers' subjective perceptions of environmentally friendly products or services is influenced by consumers' cognitive and emotional factors.

Trust is also a factor. Consumers respond positively to environmental information in marketing advertising because they believe it is trustworthy [45]. But false ecological information leads consumers to refuse to change their behavior because they do not trust the information conveyed to them [46]. When consumers obtain environmental knowledge related to mobile phone recycling in the context of online recycling, and agree that it is environmentally friendly to participate in the recycling of used mobile phones, they will then have a favorable view towards participating in online recycling and recycling platforms. This kind of trust generated by the company's environmental performance is GT, which means relying on a company based on its reputation, consumer expectations and trust, or consumer expectations of the company's environmental performance capabilities [25]. This paper proposes the following hypothesis:

H2a. *The EKPR provided by an online recycling platform is positively related to consumers' GPV.*

H2b. *The EKPR provided by an online recycling platform is positively related to consumers' GT.*

Previous studies have shown that CSR not only directly affects consumers' willingness to participate but also affects consumer perceptions [47]. For environmentally friendly products, ECSR can enhance consumer perceptions of value [48], and thus can increase their willingness to purchase these products [49]. In the context of online recycling, recycling companies create a good environmental image by transmitting their information that contributes to environmental protection, thereby increasing consumers' green perception value for recycling companies.

On the other hand, studies have shown that corporate environmental responsibility increases consumer trust [50,51], resulting in positive word of mouth and a willingness to purchase [52,53], which is a long-term and beneficial positive impact [54]. Thus, this research proposes the following hypothesis:

H3a. *The ECSR provided by a online recycling platform is positively related to consumers' GPV.*

H3b. *The ECSR provided by a online recycling platform is positively related to consumers' GT.*

In prior research on behavioral interventions, scholars suggested that the combination of interventions has a better impact on environmental behavior [55–57]. In this research, two types of information differed in the subject and content of their descriptions, and the combination of both could produce synergistic effects to achieve better intervention effects. Therefore, the following hypotheses are proposed:

H4a. *Compared with single green information, the combination of EKPR and the ECSR provided by an online recycling platform can strongly affect the GPV of consumers.*

H4b. *Compared with single green information, the combination of EKPR and the ECSR provided by an online recycling platform can more strongly affect the GT of consumers.*

2.2.3. The Mediating Effect of GPV

Consumers' value judgements affect their purchase intention [29], meaning a purchase intention level corresponding to low-value products is also low, and high-value products correspond to a higher purchase intention [58]. An online recycling mode is more environmentally friendly, safe, convenient, and efficient than traditional recycling methods, and may achieve the environmental value of consumers and meet their expectations, thus producing a corresponding PI. Therefore, the paper proposes the following hypothesis:

H5. *The GPV of consumers is positively related to the consumers' PI for online recycling.*

Based on the above logical relationship between EKPR, ECSR, and GPV, this study assumes that GPV mediates between two types of green information and consumers' PI in online recycling. Thus, the following hypotheses are proposed:

H6a. *Consumers' GPV has a mediating effect on the relationship between the EKPR of the recycling platform and the PI of consumers.*

H6b. *Consumers' GPV has a mediating effect on the relationship between the ECSR of the recycling platform and the PI of consumers.*

2.2.4. The Mediating Effect of GT

Trust plays an important role in the Internet environment. If consumers do not believe the website they are using, then they will not participate in online transactions [59]. Consumer trust is a pre-requisite for consumers' willingness to purchase goods [60]. The mobile phone is a product that combines high privacy risk and high resource value. Consumers' PI will only be generated when they believe that the use of online recycling can protect their privacy and provide environmentally friendly services for the recycling of mobile phones and other goods. Accordingly, this research proposes the following hypothesis:

H7. *The GT of consumers is positively related to the consumers' PI in online recycling.*

Based on the above logical relationship between EKPR, ECSR, and GT, this study assumes that GT mediates between two types of green information and consumers' PI in online recycling, so the following hypotheses are also proposed:

H8a. *Consumers' GT has a mediating effect on the relationship between the EKPR of the recycling platform and the PI of consumers.*

H8b. *Consumers' GT has a mediating effect on the relationship between the ECSR of the recycling platform and the PI of consumers.*

2.2.5. The Moderating Effect of RPR

Corporate reputation is a consumer's perception of a company's quality, reliability, integrity, and visibility. It is based on past behaviors and outcomes of an enterprise, demonstrating the ability of a company to deliver valuable results to various stakeholders [61]. A good corporate reputation means that consumers have a positive attitude towards the business, while a negative corporate reputation is the opposite [62]. Consumers' trust in a company will be affected by the reputation of that company. Reputation is a unique means of competing against other companies [63], which can be used as an external stimulus to influence the establishment of a long-term trust mechanism. As the main carrier of online recycling, the word of mouth of a recycling platform directly affects consumer impressions

of recycling enterprises. Therefore, when the external reputation of a recycling platform is high, consumers have a good first impression of that recycling platform, thus increasing the possibility of recycling participation. This paper proposes the following hypotheses:

H9a. *The RPR has a regulating effect on the relationship between the EKPR provided by the Internet recycling platform and the GT of consumers.*

H9b. *The RPR has a regulating effect on the relationship between the ECSR provided by the Internet recycling platform and the GT of consumers.*

The above hypotheses, supported by the relevant literature, are explained and incorporated in the research model in Figure 1.

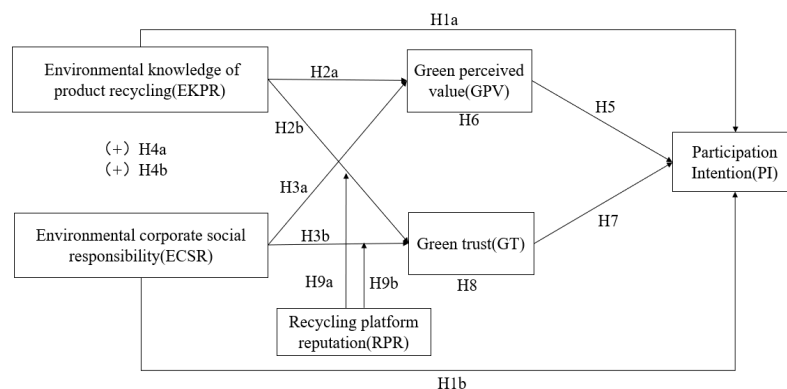


Figure 1. The research model.

3. Methods

3.1. Experiment Design

The purpose of this research is to study the impact of green information on consumers' PI in recycling and its impact mechanism in the context of the Internet while considering the moderating effect of RPR. After considering the difference between online and traditional recycling behavior, this paper selected a situational experiment method for research. In this paper, waste mobile phones were selected as the product category of WEEE for research. There were two reasons for this decision. Firstly, waste mobile phones account for the largest proportion of e-waste [6], and have more per capita possession than any other category of e-waste [21]. Compared with other WEEE, obsolete mobile phones are small in size and high in value, and convenient for transportation purposes [22]. Therefore, most of the online recycling platforms accept mobile phones as the main products for recycling. Secondly, since mobile phones are easy to store and entail privacy issues for users because of their contents, many used mobile phones are stored at home by users to form a 'hidden stock'. Therefore, this paper intends to guide users to participate in recycling by using an information intervention.

The purpose of Experiment 1 was to examine the main and mediating effect. It used a 2 (EKPR: yes vs. no) $\times$ 2 (ECSR: yes vs. no) between-group design to test the key hypotheses. Green information is the independent variable and PI is the dependent variable.

The purpose of Experiment 2 was to test the moderating effect. This experiment is utilized a 2 (green information: EKPR, ECSR) $\times$ 2 (RPR: high, low) between-group design to test the moderating effect of RPR. This experiment puts the platform reputation stimuli at the forefront to avoid the platform reputation evaluation being affected by the company's ECSR information. In addition, scoring behavior as a behavioral commitment helps to strengthen the evaluation of the platform's reputation.

3.2. Experimental Materials

The materials designed in this experiment include experimental manipulation materials and variable measurement scales.

Experimental manipulation mainly includes two aspects of green information and recycling platform reputation. To eliminate the influence of brand and subject preference on the experimental results, an online recycling company called the R company with mobile phones as the main recycling product was virtualized based on the publicity of the website of an existing recycling platform. The stimuli of corporate reputation refers to the research conducted by Fombrun [64]. The high platform reputation stimuli were described as having a large market share and a high user evaluation, and the low reputation stimuli were described as having many user complaints and a low social evaluation.

The questionnaire used in this study mainly includes three scales, including GPV, GT, and PI. Scale items were adapted from the existing literature, as indicated in Appendix A. The above scales were measured using a Likert 7-point scale (1-Totally disagree to 7- Totally agree). In addition, this study designed control test items for green information and RPR. Among these items, it tested whether the material's manipulation of the category of green information is effective by judging whether the information involved in the material is known.

3.3. Pre-Experiment

In the pre-experiment, 30 students from several comprehensive universities in China were randomly selected as the subjects, including 13 males, accounting for 43.4% of the subjects and 17 females, accounting for 56.7%. Pre-experiment results showed that 94.4% of the subjects believed that reading the EKPR material was helpful for them in understanding the reasons for and process of recycling used mobile phones. Moreover, 92.8% of the respondents believed they understood the company's environmental responsibility after reading the ECSR materials. At the same time, in the group with platform reputation information, the participants had significant differences regarding the reputation of the platform ($M_{\text{high-reputation}} = 5.6$, $M_{\text{low-reputation}} = 2.45$, $p = 0.000$). Based on the results of the pre-experiment, the two kinds of information stimulating materials accurately express the information that they want to provide, and the perception of the reputation of the platform is also significantly different. Therefore, pre-experimental information stimulation materials and platform reputation experimental materials were used in the formal experiments.

3.4. Participants

In terms of the selection of the subjects, Aihuishou is China's largest C2B electronic product recycling and trade-in service Internet platform [1]. The data from the Big Data Research Institute show that the age of users participating in recycling has become younger. In 2017, the number of users under the age of 20 had doubled compared with 2016. There is also a significant growth rate in the 21–25 age range, and the overall user volume is increasingly including younger groups. Based on these considerations, this experiment recruited 365 students from several universities in China to conduct experiments in fixed classrooms. There were 295 final effective questionnaires and the recovery rate was 81.1%. Among these questionnaires, 155 were for experiment 1 and 140 were for experiment 2.

4. Results

4.1. Manipulation Checks

After reading the stimulus materials about the EKPR, 98.6% of the participants believed that the materials helped them understand the process of recycling used mobile phones. In terms of the ECSR, 95.9% of the participants believed they understood the environmental social responsibility of the company after reading the materials. It can be seen that the use of green information in this experiment was successful. Moreover, we calculated the means for the RPR item and performed an independent t test comparing the mean value of the RPR material. The reputation of the High-RPR

group was significantly higher than that of the Low-RPR group ($M_{\text{high-reputation}} = 5.92$, $M_{\text{low-reputation}} = 2.42$, $p < 0.001$). The RPR material usage was therefore successful.

4.2. Reliability Checks

This study tested the GPV, GT, and PI scale by using SPSS 22. The results are shown in Table 1. The Cronbach's α coefficient of each variable was greater than 0.8, which shows that the scale used in this study has high credibility and good internal consistency.

Table 1. Reliability Checks.

Variable	Item	Item Loading	Cronbach's α
GPV	GPV1	0.831	0.871
	GPV2	0.805	
	GPV3	0.749	
	GPV4	0.784	
GT	GT1	0.840	0.918
	GT2	0.843	
	GT3	0.830	
	GT4	0.780	
PI	PI1	0.718	0.878
	PI2	0.759	
	PI3	0.664	
	PI4	0.600	

4.3. Hypotheses Tests

4.3.1. Main Effect

First, the impact of green information on consumers' PI in online recycling was examined. The results of the analysis of variance are shown in Table 2. As can be seen, green information has a significant effect on consumers' PI in online recycling. Specifically, the experimental group that read the EKPR information has a higher PI than the control group without green information ($M_{\text{EKPR}} = 5.0814 > M_{\text{control}} = 4.4934$, $p = 0.04$). EKPR has a significant positive impact on consumers' PI in online recycling, meaning H1a is supported. Similarly, ECSR information has a significant positive impact on consumers' PI in online recycling ($M_{\text{ECSR}} = 5.2426 > M_{\text{control}} = 4.4934$, $p = 0.04$), meaning H1b is supported.

Table 2. Independent Sample T-test.

	PI of Consumers	SD	GPV	SD	GT	SD
Control group (N = 38)	4.493	0.750	5.059	1.141	4.389	0.875
EKPR group (N = 43)	5.081**	1.005	5.616*	0.808	4.669	0.647
ECSR group (N = 34)	5.242***	0.827	5.625*	0.822	4.992**	0.765
EKPR x ECSR group (N = 40)	5.925***	0.526	6.088**	0.571	5.656***	0.530

Note: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Next, we examined the impact of green information on consumers' perceptions. The results of the analysis of variance show that green information has a partially significant main effect on consumers' perception. EKPR information has a significant positive impact on consumers' GPV ($M_{\text{EKPR}} = 5.616 > M_{\text{control}} = 5.059$, $p = 0.012$), H2a is supported. Likewise, the ECSR has a significant positive impact on consumers' GPV ($M_{\text{ECSR}} = 5.625 > M_{\text{control}} = 5.059$, $p = 0.02$), H3a is therefore supported. The experimental group reading the two kinds of information had a higher average value of GPV than the experimental group that only read one kind of information ($M_{\text{interaction group}} = 6.088 > M_{\text{EKPR}} = 5.616$, $p = 0.003$; $M_{\text{interaction group}} = 6.088 > M_{\text{ECSR}} = 5.625$, $p = 0.006$), hence H4a is established.

The GT of the experimental group that read the EKPR was not significantly higher than that of the control group without green information ($M_{EKPR} = 4.669 > M_{\text{control group}} = 4.389$, $p = 0.103$), and the EKPR does not have a significant positive impact on GT of consumers. These results suggest that H2b is not supported. In addition, the ECSR has a significant positive impact on GT ($M_{ECSR} = 4.992 > M_{\text{control group}} = 4.389$, $p = 0.03$), hence H3b is supported. Moreover, the experimental group that read both two kinds of information showed a higher average of GT than the experimental group that only read one kind of information ($M_{\text{interaction group}} = 5.656 > M_{EKPR} = 4.669$, $p = 0.000$; $M_{\text{interaction group}} = 5.656 > M_{ECSR} = 4.992$, $p = 0.000$), meaning H4b is established.

4.3.2. Mediating Effect

The most common method of studying mediation is the test procedure proposed by Baron and Kenny (1986), which is called the “progressive regression method” [65]. The mediating effect of the judgement variable is evaluated via the following three steps: the regression of the dependent variable by the independent variable, the regression of the independent variable to the mediating variable, and the regression of the independent variable and the mediating variable together with the dependent variable. Next the virtual coding of the independent variables with reference to stepwise regression was completed. The green information experimental group was assigned a value of 1, and the control group was assigned a value of 0. Next, we constructed a linear regression equation and performed a stepwise regression. The regression results of GPV are shown in Table 3. The regression results of GT are shown in Table 4.

Table 3. The mediating role of GPV ^a.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EKPR	0.309**		0.588**		0.287***	
ECSR		0.566*		0.749***		0.520**
GPV					0.518***	0.405***
R ²	0.142	0.075	0.099	0.188	0.504	0.405
Adj-R ²	0.136	0.062	0.088	0.177	0.497	0.388
F	25.24	5.707	8.707	16.257	77.18	23.47

^a Note: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; the independent variables of Model 1 and Model 2 is GPV, the others are the PI of consumers.

Table 4. The mediating role of GT.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EKPR	0.156		0.588**		0.363*	
ECSR		0.604**		0.749***		0.367*
GT					0.660***	0.633***
R ²	0.011	0.121	0.099	0.188	0.568	0.546
Adj-R ²	0.004	0.108	0.088	0.177	0.557	0.532
F	0.747	9.633	8.707	16.257	51.247	41.428

Note: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; the independent variables of Model 1 and Model 2 is GT, the other variables are the PI of consumers.

The first step is to use green information as an independent variable and PI as a dependent variable. The results show that EKPR and ECSR have a significant positive impact on the PI of consumers. Secondly, green information was taken as an independent variable and GPV as a dependent variable for regression. The results show that the EKPR ($\beta = 0.309$, $p < 0.01$) and ECSR ($\beta = 0.566$, $p < 0.05$) have a significant positive impact on the GPV, again supporting the hypotheses H2a and H3a. Lastly, the intermediate variables are added, the EKPR ($\beta = 0.287$, $p < 0.001$) and the GPV ($\beta = 0.518$, $p < 0.001$) are used as independent variables, and the PI is the regression analysis. The results show that the impact of EKPR on PI is significantly reduced while the coefficient is $0.287 < 0.588$, which indicates that

GPV plays a part in mediating role in EKPR on PI. In addition, ECSR ($\beta = 0.520$, $p < 0.01$) and GPV ($\beta = 0.405$, $p < 0.001$) were independent variables, and PI was the regression analysis of the dependent variable. The results showed that the effect of ECSR on PI decreased significantly, with a coefficient of $0.520 < 0.749$, indicating the GPV plays a part in mediating the role of ECSR on PI. In accordance with the above, H5, H6a, and H6b are supported.

As shown in Table 4, the results show that the effect of EKPR on GT is not significant ($\beta = 0.156$, $p = 0.390 > 0.05$), meaning H2b is rejected. According to the stepwise regression method, the coefficient of the regression of the independent variable X to the intermediary M or the mediation of the dependent variable Y is not significant, and the relationship between X and Y is not developed by the intermediary of M. Therefore, GT does not play a mediating role in EKPR on PI, meaning H8a is not supported. The ECSR ($\beta = 0.604$, $p < 0.01$) has a significant positive impact on GT, again verifying that H3b is supported. Lastly, the intermediate variable was added in Equation 3 to recover the ECSR ($\beta = 0.367$, $p < 0.05$) and GT ($\beta = 0.633$, $p < 0.001$) as independent variables, and the PI was the regression analysis. The results show that the impact of ECSR on the PI is significantly reduced, with a coefficient of $0.367 < 0.749$, indicating that GT plays a partial intermediary role in ECSR on PI. In summary, H7 and H8b is supported, while H8a is not supported.

4.3.3. Moderating Effect

Based on the above results, the EKPR has no significant impact on GT, meaning H2b is not supported. The RPR cannot be adjusted in the impact of EKPR on GT, so H9a is rejected.

The SPSS22.0 was used to analyze the experimental results by using one-way ANOVA. The significance of the difference between the High-RPR group and the Low-RPR group was used as the test standard to test the regulatory role of the RPR. Before performing the analysis of variance, a homogeneity test of variance was performed first. When the variance is equal, the LSD test is commonly used, and when the variance is not uniform, the Dunnett T3 test is used. The single factor homogeneity test results indicate that the variance is homogeneous ($p_{\text{high}} = 0.4473 > 0.05$, $p_{\text{low}} = 0.11 > 0.05$), thus the LSD test was used, and the experimental results are shown in Table 5.

Table 5. The Moderating Effect of RPR.

		GT
Control group (N = 38)		4.3882
High-RPR group (N = 38)		5.6579
The ECSR	Mean Difference (High-RPR—control group)	1.2697*** (0.000)
	Low-RPR group (N = 33)	3.7121
	Mean Difference (Low-RPR—control group)	−0.6761** (0.001)

Note: *** $p < 0.001$; ** $p < 0.01$.

Further analysis (Figure 2) showed that after receiving the ECSR information, the High-RPR group scored higher on the recovery company than the Low-RPR group. Thus, the scores of the GT showed significant differences between the High-RPR group and the control group; the mean difference is 1.2697, which was significant at the 1% level. There was also a significant difference between the GT and the control group in the Low-RPR group, with a mean difference of −0.6761, which was significant at the 1% level. Therefore, RPR plays a regulatory role in the impact of ECSR on GT. Hypothesis H9b is therefore verified.

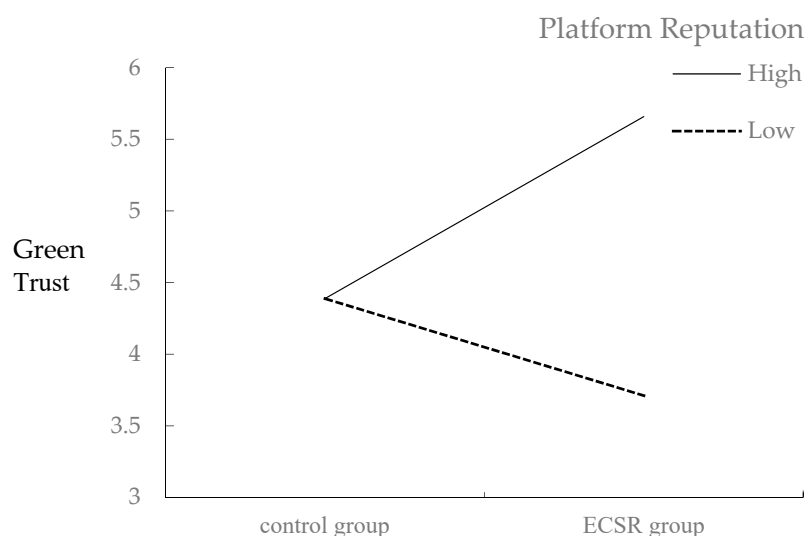


Figure 2. The Moderating Effect of RPR.

5. Discussion

5.1. Theoretical Implication

Based on the results of Experiment 1, green information has a positive impact on consumers' PI. When consumers receive green information from a recycling platform, their PI is higher than others who do not obtain green information. In addition, compared with a single example of green information, the combination of EKPR and ECSR information can strongly increase consumers' PI. This conclusion provides theoretical support for the application of information intervention to support the participation of consumers in the online recycling model, and makes up for the shortcomings of existing research on online recycling interventions. Further, this result provides a new perspective and research ideas for improving consumers' participation in online recycling.

Secondly, consumers' perceptions play a mediating role in the impact of green information on PI. GPV plays a partial intermediary role in two types of green information and consumers' PI, and GT only partially mediates the impact of ECSR on PI. Thus, research shows that the recycling platform can consumers to participate in recycling by influencing consumer perceptions of green value and their degree of trust in recycling. This result not only expands the green marketing framework proposed by Chen and Chang (2012), but also provides new ideas for attracting users to the existing Internet recycling platform. In addition, the GT only plays a partial mediating role in developing ECSR to boost PI. H2b, H8a, and H9a in this paper are rejected [25]. This result shows that when consumers get EKPR, they can feel the environmental value of recycling and have a certain PI. However, due to the nature of Internet recycling, the PI developed through environmental knowledge information may be due to consumers' support for environmental protection, rather than through trust in a platform. In the Internet age, the functions of mobile phones are becoming more and more complete, and people are paying increasing attention to privacy. The mobile phone contains a large amount of personal privacy information so consumers can consider a recycling platform for environmental protection and the security of the recycling process to determine whether that platform is credible, not only based on inner support for environmental protection.

Lastly, RPR plays a regulatory role in affecting the impact of ECSR on consumers' PI in online recycling. The results of the moderating effect show that when the RPR is low, the consumers who accept the ECSR information have less PI toward online recycling than the consumers who do not accept this information. This result shows that consumers do not blindly believe in the image of a company's propaganda, but will consider external evaluations of a company. This over-beautification of the company's environmental image is called 'Green Washing' [66], which often causes the opposite effect.

Consumers provide their responses based on the comprehensive judgments of the ECSR information and the reputation of the recycling companies. Therefore, enterprises must establish a good reputation mechanism, use their reputations reasonably to improve consumers' trust, and avoid greater losses due to developing poor reputations.

5.2. Managerial Implication

First, recycling companies should develop green information that is compatible with business operations. The research in this paper shows that green information can enhance consumers' PI in online recycling, and consumers who have access to EKPR and ECSR information at the same time have a higher PI. Internet recycling companies, as typical of environmentally friendly enterprises, should combine the characteristics of the recycling industry with green environmental information to develop promotional information. On one hand, Internet recycling companies should generate extensive publicity about the environmental significance and resource value of recycling, so that consumers can better understand the recycling industry and Internet recycling platforms. On the other hand, recycling companies can organize environmental protection-related activities in the form of developing a relevant corporate identity, and expanding their environmental protection knowledge while improving their environmental image and consumers' goodwill towards the company, thereby increasing the consumer participation rate.

Second, recycling companies should pay attention to improving consumers' emotional awareness of recycling. The results of this paper also show that green information not only directly affects consumers' willingness to participate in online recycling, but also indirectly affects their willingness to participate by increasing the green perceived value and green trust. Because of the current insufficient participation rate in online recycling, the information presentation mode and the interactivity of the website can be improved to benefit the platform experience. In terms of platform services, it is possible to build a convenient offline recycling process and a supporting logistics system to enhance the core competitiveness of a company; additionally, this approach can then enhance consumers' awareness of the environmental significance of online recycling and the ability of the company to recycle environmentally friendly products. Thus, consumers develop higher green values and trust, and then form PI in online recycling.

Third, recycling companies must establish a good reputation mechanism. The research shows that when consumers think that the RPR is low, those who obtain information on the ECSR of recycling enterprises will have lower green trust than those without this information. Therefore, a recycling platform should establish a good image of their internal and external consistency, and strive to undertake more social responsibility in environmental protection. At the same time, recycling companies must pass on social responsibilities to consumers through various channels and establish a good impression and reputation. Further, companies must strive to make a good impression on recycling platforms at the beginning of consumption process, so consumers can trust the recycling platform. On this basis, it is better to establish a good platform reputation, gain the long-term trust of consumers, and establish a tendency towards conducting further transactions.

6. Conclusions

Based on the SOR model, this study considers the regulatory role of RPR and studies the impact of green information intervention strategies on consumers' PI in online recycling. Through two experiments, the data regarding consumers' PI in online recycling were collected, and SPSS22.0 was used for statistical analysis to analyze the relationship between variables such as green information, GPV, and GT and the PT of consumers. The findings are as follows.

(1) Consumers who receive EKPR information or ECSR information have a higher PI for online recycling than consumers who do not accept green information. In particular, the consumers who receive both types of information have a higher PI than those who only receive a single type of information.

(2) Green information can not only directly affect consumers' willingness to participate, but also indirectly affect consumers' PI through their perception. EKPR information can indirectly influence consumers' PI by building consumers' green perceived value and green trust, while ECSR information can only indirectly influence consumers' PI by cultivating green trust.

(3) The results of moderating effect show that when the RPR is high, consumers who have received ECSR information on recycling enterprises have a higher PI in Internet recycling. When the RPR is low, the consumers who accept the ECSR information have less PI toward the online recycling than the consumers who do not accept this information.

Despite these promising findings, this article has some limitations. This study used contextual experiments to collect data by designing an experimental questionnaire for Internet recycling scenarios. Although a detailed explanation is given during the experiment, the subject's understanding and the degree of seriousness may have a certain impact on the experimental results. In the future, one should consider conducting experimental research in a real website environment, and create a real-use situation as a more vivid way to improve the experimental results. In addition, this article selected students in the sample, as this age group is the main force behind current recycling trends. However, various other occupations, social experiences, and income levels may also have a certain impact on consumers' choices. Therefore, in the future, we can try to expand the demographic variables of the sample and increase the scalability of the experimental results.

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Appendix A

Constructs	Items
Green Perceived Value [43,67]	GPV1 Participating in the recycling of this website will help to improve the ecological environment. GPV2 Participation in the recycling of this website will reduce environmental pollution; GPV3 Participation in the recycling of this website is good for social development; GPV4 Participating in the recycling of this website will help to raise environmental awareness.
Green Trust [68,69]	GT1 From my perspective, environmental protection reputations for the recycling company is reliable. GT2 From my perspective, environmental protection information for the recycling company is reliable. GT3 From my perspective, environmental protection claims for the recycling company is trustworthy. GT4 From my perspective, environmental protection concerns for the recycling company fulfill my expectations.
Participation Intention [70,71]	PI1 I support the company's practice of recycling old mobile phones on the Internet + recycling mode. PI2 I am willing to try to recycle used mobile phones by internet company. PI3 If I have a used mobile phone to be recycled, I will give priority to the internet company. PI4 I am willing to recommend this internet recycling company to my friends and family.

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