

## Article

# Toward a Comprehensive Model of Green Marketing and Innovative Green Adoption: Application of a Stimulus-Organism-Response Model

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**Abstract:** An increasing number of people and organizations have become aware of global warming and environmental deterioration and have become engaged in socially responsible activities to save the Earth. However, a comprehensive model that integrates the antecedents, mediators, and moderators of green adoption is yet to be developed. In this study, a comprehensive research model was developed that incorporates a stimulus-organism-response (S-O-R) model, consumption value theory, and value-belief-norm theory. A quantitative approach was adopted to collect data from customers who had experience with green purchasing in Taiwan. The empirical findings reveal that the influence of green marketing activities on three mediators—consumers' environmental attitude, consumption values, and personal norms—is significant. These three mediators have a significant impact on consumers' innovative green adoption. Thus, a full mediation effect is found, suggesting that marketers should increase their focus on promoting innovative green adoption through environmental attitude, consumption values, and personal norms. The findings of this study may help academicians in conducting further theoretical validation and professionals in developing applicable marketing strategies to promote green adoption.

**Keywords:** green marketing; environmental attitude; consumption value; environmental self-identity; perceived social responsibility; innovative green adoption



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## 1. Introduction

Globalization has considerably enriched the growth of the world economy; however, many economic activities have also damaged the global ecology and environment. People have gradually become aware of the importance of sustainability for society. The United Nations [1] proposed 17 Sustainable Development Goals (SDGs) and 169 targets to identify the extent of the agenda for worldwide sustainable development. Green consumerism has consequently become a major trend internationally. It encompasses eco-friendly production and packaging, energy conservation, recycling, energy-efficient appliances, and renewable and proper waste disposal. In the past two decades, the literature on green consumption has covered the relationships between motivation, attitude, behavior, and environmental constructs [2]. Green marketing and perceived social responsibility have also become major issues in promoting consumers' purchase intention and adoption [3,4].

Numerous companies have recognized the notion of green marketing and the paramount importance of green initiatives in marketing to fulfill customer needs and promote competitiveness among firms [5]. An increasing number of consumers have become worried about environmental degradation and the negative impact of using products that harm the environment. Green marketing (in the form of green products, prices, places, and promotions) has played a key role in addressing consumers' environmental concerns and their need for green purchasing options. Following the marketing efforts of companies,

removing hazardous raw materials from the production process, reducing waste, and offering the best prices through green channels and promotions are recognized as some of the key measures in green marketing. Even service industries have begun to undertake innovations to decrease their energy consumption [6].

The environmental attitude of consumers has a significant impact on their consumption values, including social value (image concern, peer opinions), epistemic value (desire to seek knowledge), conditional value (influence of promotional activities and subsidies), and value for money (perception of product performance with respect to price) [7]. A theory of consumption values and argued that they may drive consumer decisions and choices [8]. Thus, consumption values may influence consumers' green adoption [9]. If a green marketing campaign can fulfill customers' needs and wants, then their consumption values will also influence their personal (ethical) norms and innovative green product adoption. Environmental self-identity is also viewed as an essential factor for consumers to act in an ecologically friendly manner [10]. Social responsibility theory [11], stating that consumers are accountable for fulfilling their civic duty and acting for the benefit of the entire society. Thus, if the level of consumers' perceived social responsibility is high, then the influence of consumption values on green product adoption may increase. In this study, perceived social responsibility is proposed as a critical moderator for accelerating consumers' innovative green product adoption. Furthermore, consumers' perceived social responsibility (self-imposed or based on social expectations) is likely to facilitate a sense of moral obligation around the environment, which would serve as a promoting agent to amplify the influence of consumption values and personal (ethical) norms on consumers' innovative green product adoption [12].

Although previous studies paid a great deal of attention to environmental deterioration, green marketing, and social responsibility, a comprehensive framework to integrate relevant constructs is yet to be developed. Previous studies in marketing focused too much on fragmented views, thus making it difficult to develop a comprehensive framework [13]. This study intends to address this research gap to identify the antecedents, mediators, and moderators of green adoption.

Previous studies related to green adoption also focused on consumer behaviors, with very little emphasis on integrating relevant theories to explain this phenomenon. This study intends to fill this research gap by integrating the concepts of a stimulus-organism-response (S-O-R) model, value-belief-norm (VBN) theory, and consumption value theory to explain our research framework.

Specifically, following the S-O-R model, this study proposes that an external stimulus (e.g., marketing activities) may affect consumers' perception (O) (e.g., environmental consumption values, personal norms, and environmental self-identity), which further triggers an emotion that generates a response (R) (e.g., green adoption). Consumption values theory is also used to explain the influence of values (e.g., value for money and social, conditional, and epistemic value) on green adoption. VBN theory is further adopted to confirm the causal chain of values-beliefs-norms-behaviors in the context of environmental and green issues. VBN theory is also used to explain the influences of ethical norms, self-identity, moral obligations, and social responsibilities on green adoption. Based on the above, the objectives of this study are threefold:

- (1) To identify the effect of green marketing stimuli on environment attitudes, consumption values, personal (ethical) norms, and environmental self-identity.
- (2) To investigate the interrelationship between environment attitudes, consumption values, personal (ethical) norms, and environment self-identity and their influence on innovative green product adoption.
- (3) To investigate the moderating role of perceived social responsibility in the influence of consumption values and personal norms on innovative green adoption.

## 2. Literature Review

### 2.1. Theoretical Background

#### 2.1.1. stimulus-organism-response Model

The stimulus-organism-response (S-O-R) model [14–16], which is considered to be a significant paradigm for exploring how people react to stimuli. The main idea of this theory is to expand our understanding of how environmental stimuli (S) affect consumers' perceptions (O), which further trigger emotions that generate consumer responses [11,13,17]. The S-O-R model has been widely adopted in traditional marketing and the study of consumer behaviors, but it has been rarely applied in the domain of environmental concerns and green product adoption [18]. One reason for the lack of such investigation may be the extensive differentiation of stimuli, given the presence of countless types of stimuli in the context of the environment. The issue of how environmental stimuli can influence consumer engagement needs to be examined [16].

The term "organism" is defined as an internal process that can influence the relationship between external stimuli and individual responses [18,19]. The idea that stimuli can influence consumer responses through the mediation of the organism is logical to assume. Therefore, the proposal in this study is that effective green marketing activities function as stimuli (S); consumption values, personal norms, and environmental self-identity serve as the organism (O); and innovative green product adoption represents the response (R). Along with this proposal is the suggestion that consumption values, personal norms, and environmental self-identity mediate the relationship between effective green marketing activities and innovative green product adoption.

#### 2.1.2. Consumption Value Theory

Consumption value theory refers to the logical knowledge required to answer the question of why consumers purchase or do not purchase a product or service when choosing one product or brand over another. Three main schemes constitute the theory: (1) consumer choice, which results from multiple consumption values; (2) consumption values, which make differential contributions to any given choice situation; and (3) consumption values, which are independent [8]. The notion of value is defined as a personal concept, including intrinsic needs such as emotional aspects, attaining knowledge, and other implicit factors pertaining to experiential needs and wants in relation to making a purchase [9]. The current study employs four dimensions of consumption values (value for money, social, conditional, and epistemic value) to measure the main construct of consumption value [9]. These values are recognized as major tools to use when judging between what price to pay and what consumers will perceive. The values of green products are typically considered as a vital factor in decision-making.

#### 2.1.3. Value–Belief–Norm Theory

Value–belief–norm (VBN) theory to determine how people's values can explain their behaviors in the environmental context. According to this theory, values, beliefs, norms, and behaviors constitute a causal chain [20]. In particular, people's altruistic values, biosphere values, egoistic values, and openness to change are major influential factors in the formation of beliefs (including awareness of the environment and the assumption of social responsibility), which further impact personal norms and pro-environment behaviors. In addition, the values that influence beliefs around the responsibility to address or resolve environmental deterioration are also explained in the VBN framework. Such beliefs and ideas are essential parts of the formation of personal norms, such as a feeling of moral obligation around environmental preservation, and are major drivers for people to engage in pro-environment behaviors [12]. VBN theory is used in the present study to explain the relationships between values, attitudes, norms, and environmental self-identity.

## 2.2. Conceptualization of Research Constructs

### 2.2.1. Stimulus

Green marketing stimuli include environmental marketing activities; the aim is to conduct marketing practices that promote and protect environmental welfare. Undertaking green marketing allows businesses to guarantee prosperity through product innovation, pricing, retailing, and promotion activities to fulfill consumer needs and wants [21] and minimize the negative impact on the environment [22,23]. In the current study, the notion of effective green marketing stimuli is defined [22,23]. Additionally, we use the green marketing mix, a concept pertaining to the enhancement of critical value to decrease the negative impact on the environment [24].

*Green price:* Price is the key factor in the marketing mix. Green price refers to the price that consumers will pay for the additional value of green products [25]. For firms, this aspect requires consideration of some vital features while setting basic prices, or even premium prices, for their products based on the performance, specific function, design, visual appearance, and overall quality of green products [26,27].

*Green product:* Products manufactured by processes that are safe for the environment reduce the harmful consumption of natural resources and mitigate pollution, while increasing the likelihood of sustainable environmental welfare in the future [26].

*Green promotion:* Green promotion is a significant tool for conveying messages that inform consumers and persuade them to consider going green [25,26]. The goals of green promotion are threefold: to express the relationship between green products and the biophysical environment; to support a green lifestyle, either including or excluding particular products or services; and to improve and sustain environmentally responsible undertakings in terms of their reputation [28].

*Green place:* Green place refers to the methods of delivering or allocating products to facilitate consumers' approachability [25,29]. It also refers to companies transporting their products in a way that eliminates emissions [27].

### 2.2.2. Organism

In this study, "organism" includes the factors of environmental attitude, consumption values, personal norms, and environmental self-identity.

*Environmental attitude:* Environmental attitude as an orientation that influences consumers' concern for the environment. The idea of environmental attitude can also be described as environmental concern that consumers demonstrate while making decisions or judgments on green products to minimize the negative impact on the environment [30]. A growing number of consumers have become interested in participating in ecological practices to reduce the detrimental impact on the environment, which can affect their buying attitude. Environmental attitude is recognized as a primary factor that drives consumer preference for green products [31].

Consumption Values: Four Types of Consumption Are Illustrated in This Study:

1. *Value for money:* Value for money refers to the consumer's value judgment regarding the price and benefit of the product and its performance [32]. Simply put, value for money is exemplified by the willingness to pay for green products [9]. Consumers who are concerned about the welfare of the environment are generally willing to pay premium prices for green products [33].

2. *Social value:* Social value is based on recognition from society when each individual participates in purchasing and using green products [31,34].

3. *Conditional value:* Conditional value refers to the additional value of specific green product consumption, that is, the consistency of individual benefit in terms of supplemental utility or other stimulus criteria for encouraging consumers to adopt certain products over others, or so-called substitute products [31].

4. *Epistemic value:* Epistemic value pertains to the ways consumers generate relevant information related to green products before making a purchasing decision [32]. In the

literature, related information and knowledge are the major criteria influencing consumers' purchasing intentions [35].

*Personal norms:* Personal norms refers to an individual's internal responsibility toward the environment and moral obligation to engage in pro-environment behavior; they are also known as ethical norms [36]. People's opinions about moral obligation enable them to act in a certain environmental manner [37]. Personal norms are acknowledged as a powerful sense of ethical responsibility that urges individuals to act accordingly.

*Environmental self-identity:* Environmental self-identity refers to the manner by which individuals perceive and describe themselves as people who act in an ecologically friendly fashion. In the environmental domain, environmental self-identity reflects the labels that people generally use to characterize themselves as being pro-environment [38].

### 2.2.3. Response: Green Innovative Product Adoption

Green products emerge via innovative business practices involving improvements to production processes and marketing strategies, and even adding value to products. In particular, marketing strategies influence consumers' intention to adopt innovative green products [39]. Green marketing strategies influence not only consumers' purchase intentions, but also their intent to invest in green products due to their environmental attitude or concern [40]. Thus, two sub-constructs for measuring the main construct of innovative green product adoption are suggested in this research: Innovative green product purchase intention refers to an individual's current or future intention to buy new green products [41,42]. Innovative green product investment intention refers to the degree of consumer intent to contribute to green product consumption by investing in green products; concern for the stability of the environment for the next generation underlies such intention [40].

### 2.2.4. Moderators: Perceived Social Responsibility

The feeling of perceived social responsibility can be both self-imposed and induced by social expectations, and these expectations can prompt individuals to act in a certain ecological manner. Self-interest or additional ecological benefits emerge when consumers willingly pay for or contribute to socially responsible products. Perceived social responsibility is considered as an environmental moral standard that motivates individuals to behave and act in ways that promote an environmental image and eco-lifestyle [12].

## 2.3. Hypothesis Development

### 2.3.1. Effect of Effective Green Marketing on Environmental Attitude, Consumption Values, Personal Norms, and Environmental Self-Identity

Effective green marketing was defined as the practice of using a marketing mix comprising price, product, promotion, and place (4 Ps) to reduce the impact on the environment [43]. Green marketing activities (stimuli) are undertaken to fulfill consumer needs and wants. The 4 Ps in the marketing mix constitute the most influential factor in environmental attitude; they encourage consumers to consider the environmental crisis from their own perspective [43]. A change in consumer attitude toward environmental concerns results from the potential influence of effective green product adoption with the purpose of eliminating the possible impact on the green environment [44].

The potential attribution of green marketing activities influences not only environmental attitude but also consumption values [45]. Green marketing activities are regarded as stimulus components for improving and solving the environmental crisis and satisfying green consumer needs. Hence, green marketing activities impact consumption values, including value for money and social, conditional, and epistemic value. Each component of the green marketing mix also positively impacts personal norms and environmental self-identity. A green marketing mix consisting of green price, product, promotion, and place, which is adopted by marketers and ecologically friendly campaigners, has a strong significant impact on personal norms [46]. Moreover, green marketing activities have a

positive influence on consumers' self-identity [47]. Therefore, the following hypotheses are proposed in the present research:

**Hypothesis 1 (H1).** *Effective green marketing stimuli have a positive effect on environmental attitude.*

**Hypothesis 2 (H2).** *Effective green marketing stimuli have a positive effect on consumption values.*

**Hypothesis 3 (H3).** *Effective green marketing stimuli have a positive effect on personal norms.*

**Hypothesis 4 (H4).** *Effective green marketing stimuli have a positive effect on environmental self-identity.*

### 2.3.2. Relationship between Environmental Attitude, Consumption Values, Personal Norms, and Environmental Self-Identity

Environmental attitude in terms of the psychological tendency to influence consumers' perception of or trust in the environment [48]. The environmental attitude of consumers impacts positive consumption values regarding green products [31]. Hence, environmental attitude increases consumers' awareness of consumption values toward using green products [49,50]. Additionally, consumers' environmental attitude is regarded as a stimulus factor in boosting personal norms and environmental self-identity. The psychological and logical reasoning is that an environmental attitude could be induced by concerns about and awareness of the environmental consequences. In other words, the stronger the environmental attitude, the greater the perceived consumption value and the more likely consumers will develop higher degrees of personal environmental norms and self-identity. Stated differently, the degree of environmental attitude can trigger consumers' personal norms and environmental self-identity as a result of their environmental concerns [51]. Through their environmental attitude, people strongly focus on protecting the environment and exhibit a desire to reduce the impact of consumption on the environment. Hence, environmental attitude plays a major role in influencing personal norms and environmental self-identity [52–57]. Hence, the following hypotheses are proposed in the current research:

**Hypothesis 5 (H5).** *Environmental attitude has a positive effect on consumption values.*

**Hypothesis 6 (H6).** *Environmental attitude has a positive effect on personal norms.*

**Hypothesis 7 (H7).** *Environment attitude has a positive effect on environmental self-identity.*

**Hypothesis 8 (H8).** *Consumption values have a positive effect on personal norms.*

**Hypothesis 9 (H9).** *Environmental self-identity has a positive effect on personal norms.*

### 2.3.3. Effect of Environmental Attitude, Consumption Values, Personal Norms, and Environmental Self-Identity on Innovative Green Product Adoption

Environmental attitude has a vital influence on innovative green product adoption, which is expressed through purchase behaviors [9] and investment behaviors [58]. Meanwhile, consumption values can foster long-term relationships with consumers by offering adequate value to those who are considering purchasing or investing in green products. Each component of consumption value has a beneficial impact on the intention to adopt green products. With regard to the value-for-money factor, it is argued that consumers normally make judgments on what appeals to them about purchasing a particular green product or investing in green products [33]. The social value component also has an essential impact on the intention to adopt green products via purchase and investment behaviors [40]. One possible reason underlying this relationship is that while consumers prefer to satisfy their individual needs and wants, they also desire further recognition from other people and society. In addition, conditional value also influences consumers' adoption intention [40]. The reason is that consumers are somehow dependent on the

appropriate conditional value of green products in terms of additional value or promotion, which can attract their attention to the first sign over other substitute products [31,34]. Finally, epistemic value pertains to the characteristics of product features, quality, design, and familiarity, which are considered as factors that influence purchase and investment intention. Therefore, the following hypotheses are proposed in the present research:

**Hypothesis 10 (H10).** *Environmental attitude has a positive effect on innovative green product adoption.*

**Hypothesis 11 (H11).** *Consumption values have a positive effect on innovative green product adoption.*

Personal norms, also known as ethical norms, refers to an individual's moral obligation to engage in pro-environmental behavior [10,37]. Gleim et al. (2013) indicated that ethical norms significantly influence green product adoption. Consumers with strongly pro-environment personal norms are obliged to act accordingly [36]. As such, consumers might act in an environmental manner due to the feeling of ethical obligation (personal norms). The more powerful the personal norms, the greater the possibility that moral responsibility will contribute to pro-environment consumption [52].

Environmental self-identity refers to the manner by which people perceive themselves as individuals who act in an ecologically friendly fashion [36]. An individual's environmental self-identity serves as an impetus for acting in an environmentally friendly manner [53]. Green self-identity is an imperative factor in predicting consumer behavior in various contexts [54]. Thus, a strong green self-identity typically results in formative green adoption [55]. It has further explained that environmental self-identity is one of the most significant dimensions for determining green consumption behaviors [56]. Therefore, the following hypotheses are proposed in the current study:

**Hypothesis 12 (H12).** *Personal norms have a positive effect on innovative green product adoption.*

**Hypothesis 13 (H13).** *Environmental self-identity has a positive effect on innovative green product adoption.*

#### 2.3.4. Moderating Effect of Perceived Social Responsibility

Perceived social responsibility provides the advantage of extending social norms in terms of environmental altruism. Consumers' green behavioral intentions refers to self-controlled, self-regulated, and self-disciplined behaviors that are initiated by a sense of perceived social responsibility [57]. The notion of social responsibility is acknowledged as the most influential factor in consumers' green purchasing intentions [12]. Individuals with higher perceived social responsibility (self-responsibility, social contribution, and environmental ethics) tend to exhibit stronger green adoption intention. However, the significant gap of perceived social responsibility as a moderator to accelerate innovation green product adoption is yet to be developed. This study posits that the factor of perceived social responsibility moderates the influence of consumption values and personal norms on innovative green product adoption due to certain logical expectations. When consumers have higher perceived social responsibility, it is significant to lessen the influence of consumption values and personal norms and actual innovative green product adoption. Perceived social responsibility is regarded as a key factor in predicting consumers' willingness to adopt green products, hence the distance between consumption values and personal norms in terms of green product adoption should be larger if consumers have greater perceived social responsibility. Therefore, if consumers perceive a high degree of perceived social responsibility, herd mentality will stimulate their intention to adopt green products and improve their repeat purchase rate due to their self-interest and the superior public image of adopting green products. Thus, the following hypotheses are proposed:

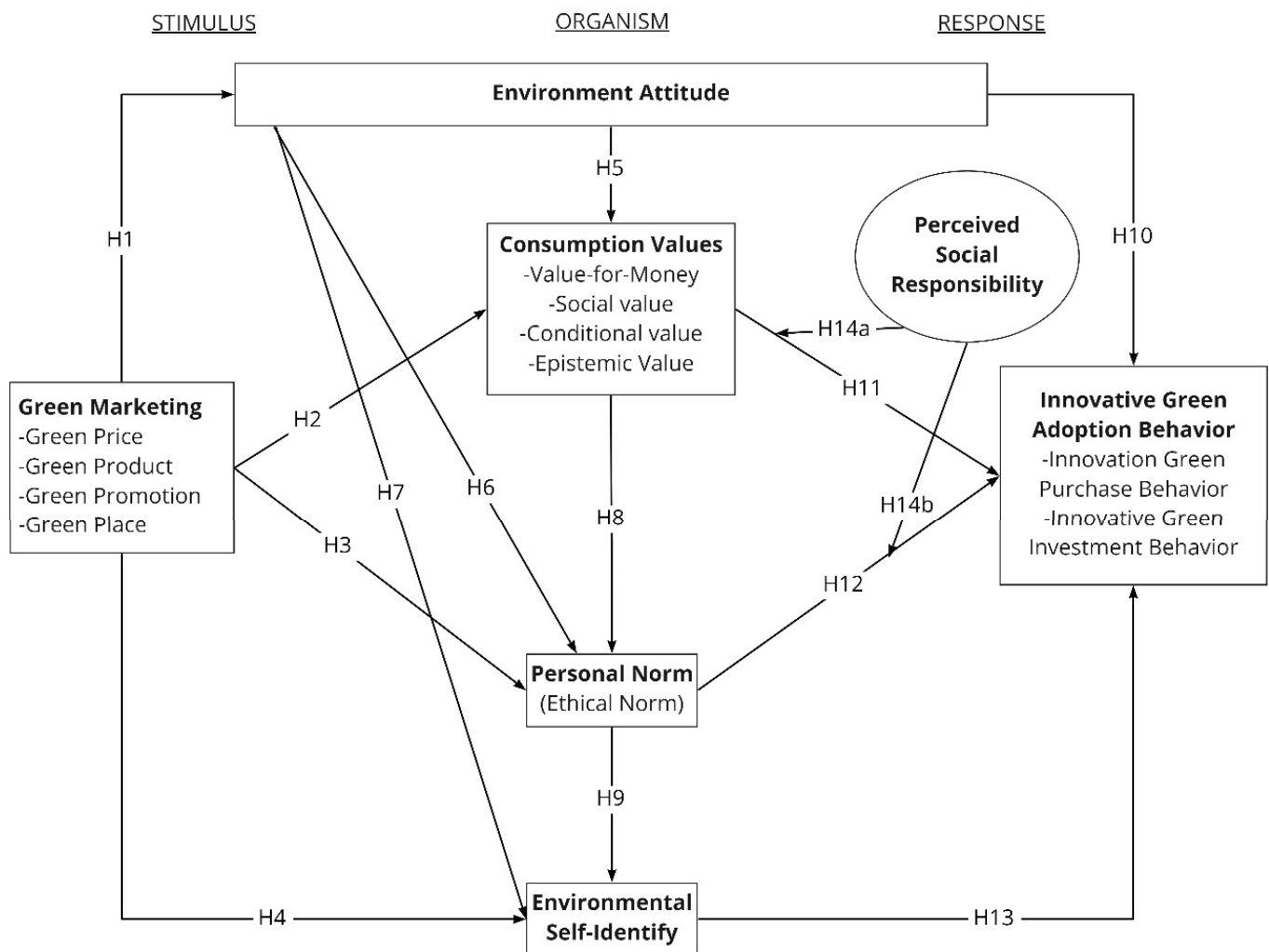
**Hypothesis 14a (H14a).** *Perceived social responsibility moderates the relationship between consumption values and innovative green product adoption.*

**Hypothesis 14b (H14b).** *Perceived social responsibility moderates the relationship between personal norms and innovative green product adoption.*

### 3. Research Methodology

#### 3.1. Research Model

Along with the development of the research hypotheses, a research framework was created. The research framework is shown in Figure 1.



**Figure 1.** Research framework of this study.

#### 3.2. Research Sampling and Data Collection Procedure

In this research, a quantitative approach was adopted to gather data from a large sample through a questionnaire survey, from which inferences and conclusions could be derived [58]. This research approach helped to improve our understanding of the interrelationships among the research constructs shown in Figure 1. The questionnaire survey was used to collect data using the convenient sampling method.

In the present research, consumers' familiarity with green marketing was considered, hence the respondents were limited to those consumers who had experience with green purchases. The respondents were asked to identify their perceptions of marketing stimuli and their opinions on environmental attitude, consumption values, personal norms, environmental self-identity, and innovative green product adoption. The population in this study was particularly large; thus, the sample size design was based on a formula [59].



Following prior research, a seven-point scale questionnaire was adopted, with the standard deviation as below. The calculation of the required sample size was carried out as follows:

Assuming that  $e = 0.02$ ,  $z = 1.96$ ,  $\sigma = 1.3$ ,

$$n = \frac{z^2 \cdot \sigma^2}{e^2}$$

$$n = \frac{(1.96)^2 \cdot (1.3)^2}{(7 \times 0.02)^2} = 331$$

Based on this calculation, the sample size of this research should be more than 331 respondents.

Additionally, all responses were collected using social media platforms (Facebook, LINE, Instagram, and Telegram) as the main tools. The Google Forms questionnaire survey was sent to target respondents who live in Taiwan, where many people use new and modern technologies, especially social media.

### 3.3. Research Instrument and Questionnaire Design

Nine principal research constructs were operationalized in this study. The latent constructs included green marketing stimuli, environmental attitude, consumption values, personal norms, environmental self-identity, and innovative green product adoption, along with the moderator of perceived social responsibility. The respondents' demographic characteristics were also collected. The questionnaire items and references for each research construct are presented in Table 1.

**Table 1.** Operational definitions of research constructs.

Construct	Measurement Items	References
Green marketing stimuli	12 items	[22,23]
Environmental attitude	3 items	[10,35]
Consumption values	14 items	[10,31,34]
Personal norms	6 items	[10,37]
Environmental self-identity	5 items	[36]
Perceived social responsibility	4 items	[12]
Innovative green product adoption	3 items 6 items	[40,41]

Specifically, this study operationalized four factors for the construct of green marketing stimuli, including green price, product, and promotion. Sample items on green price are "A company that produces green products usually charges higher prices" and "Green products that are made by this company are more expensive than non-green alternatives". Sample items on green product are "This company has been a pioneer in introducing green products to the market" and "This company offers high-quality green products". Sample items on green promotion are "This company provides a lot of information about its green products in its advertisements" and "This brand offers special promotions and deals (price discounts, coupons, etc.) to people who purchase its green products". Sample items on green place are "This company's green products can be found in stores which themselves are known for supporting environmental and green causes" and "This stores that sell green products made by this company are usually environmentally friendly themselves". For the construct of environmental attitude, this study adopted a three-item scale from [10]. Sample items are "I consider the potential environmental impact of my actions when making many of my consumption decisions" and "I am concerned about wasting the resources of our planet".

This study operationalized four factors for the construct of consumption values, following value for money, social value, conditional value, and epistemic value [10,31,34]. Sample items on value for money are “Green products are good products for the price” and “Green products are reasonably priced”. Sample items on social value are “Purchasing green products will help me gain social approval” and “Purchasing green products will make a positive impression on my peer groups”. Sample items on conditional value are “I would purchase green products over conventional substitutes if they are offered at a subsidized rate” and “I would purchase green products over conventional substitutes if they are offered at a discount or with other promotional incentives”. Sample items on epistemic value are “I prefer to check the eco-labels and certifications on green products before purchasing” and “I prefer to gain substantial information about the makes and models of green products before purchasing”.

For the construct of personal norms, this study adopted a six-item scale from [10,37]. Sample items are “I feel a moral obligation to conserve green products no matter what other people do” and “I feel guilty if I buy products that damage the environment”. For the construct of environmental self-identify, this study adopted a five-item scale from [36]. Sample items are “I think of myself as someone who is concerned about environmental issues” and “I see myself as being an environmentally friendly consumer”. For the construct of perceived social responsibility, this study adopted a four-item scale, sample items are “I would recommend eco-friendly products to my friends and family” and “I feel morally obligated to purchase green products”.

For the construct of green adoption, this study identified two factors: innovative green production adoption and innovative green product investment intention. Sample items on innovative green production adoption are “In the near future, I am willing to purchase products made from recyclable materials” and “I will make an effort to purchase this product because of environmental concerns”. Sample items on innovative green product investment intention are “I intend to invest in eco-friendly products in the future because of environmental concern” and “I expect to invest in eco-friendly products in the future because of their environmental performance”.

### 3.4. Questionnaire Design

The questionnaire items were categorized into 7 sections containing 61 items in order to let respondents express their perspective on each construct. In the closed-ended part of the questionnaire, substitute choices were provided. A 7-point Likert scale (1 = strongly disagree to 7 = strongly disagree) was used to rate the questions and measure the data.

## 4. Results and Discussion

### 4.1. Characteristics of Respondents

Among the 349 respondents, 51.58% were male. By age group, approximately 30.09% were 26–35 years of age, 26.07% were 18–25, and 23.79% were 36–45. Nearly half (51.29%) of the respondents had a master’s or a doctoral degree, and 50.14% were private sector employees. For roughly 39.82% of respondents, their average monthly income was USD 1000, for 27.51% it was between USD 1001 and USD 2000, and for 26.65% between USD 2001 and USD 3000.

### 4.2. Evaluation of the Measurement Model

SPSS (version 26) and SmartPLS (version 3) were utilized to analyze the survey data. Following Hair et al. [59,60], the current study adopted four criteria to verify the reliability of the measurement model. First, the coefficient of determination ( $R^2$ ) was used to measure the amount of explained variance of each endogenous latent construct.  $R^2$  value higher than 0.672 is substantial, 0.33 is moderate, and 0.19 is weak [61]. Second, composite reliability (CR) was used to evaluate the variance shared by respective indicators. Furthermore, CR values should be higher than 0.60. Third, Cronbach’s alpha coefficient was used to assess the internal consistency of the research constructs [62]. Cronbach’s alpha coefficient

should be higher than 0.7 [63]. To measure the convergent validity of the research construct, average variance extracted (AVE) was utilized in this study to confirm the amount of variance captured by a specific construct. An acceptable AVE value should be around 0.5 [64]. As shown in Table 1, the results of AVE range from 0.715 to 0.819, CR values range from 0.811 to 0.898, and Cronbach's  $\alpha$  coefficient ranges from 0.715 to 0.910, which all fulfill the criteria stated above. Thus, the reliability and convergent validity of the research constructs are appropriate.

To evaluate the discriminant of the research construct, this study followed the criteria [64,65]. The square root of each AVE should be higher than the correlation between constructs [62]. It has disapproved of those criteria and suggested assessing discriminant validity through the heterotrait–monotrait (HTMT) ratio of correlation, and the threshold of two ratios should not be higher than 0.85 [65]. The results show that all square roots of AVE values are higher than the highest correlation with any test construct. All HTMT values are lower than the threshold of 0.85. With both of these criteria satisfied, the discriminant validity of the research construct is ensured (Table 2).

**Table 2.** Discriminant validity of research constructs.

	GM	CV	EA	PN	ESI	IGA
GM: Green marketing	0.87					
CV: Consumption values	0.49	0.90				
EA: Environmental attitude	0.67	0.62	0.85			
PN: Personal norms	0.63	0.70	0.64	0.86		
ESI: Environmental self-identity	0.67	0.70	0.58	0.60	0.89	
IGA: Innovative green product adoption	0.75	0.60	0.66	0.70	0.78	0.86

#### 4.3. Evaluation of the Structural Model

The structural model was assessed using the parameter estimates of the paths, as stated in the research hypotheses. Following Hair et al. [66], the sample of 349 respondents in the current study was subjected to a bootstrapping resampling technique, with a sub-sample of 5000.

The path coefficients for testing the hypotheses are presented in Table 3. The results shown in Table 3 indicate that green marketing activities have a significant impact on environmental attitude ( $\beta = 0.805$ ,  $t = 40.041$ ,  $p > 0.000$ ), consumption values ( $\beta = 0.702$ ,  $t = 8.998$ ,  $p < 0.000$ ), and personal norms ( $\beta = 0.287$ ,  $t = 5.879$ ,  $p > 0.000$ ). Thus, H1, H2, and H3 are supported. However, green marketing activities do not indicate a significant influence on consumers' environmental self-identity ( $\beta = -0.066$ ,  $t = -1.291$ ,  $p = 0.197$ ). Thus, H4 is not supported. In addition, consumers' environmental attitude has a significant effect on consumption values ( $\beta = 0.542$ ,  $t = 15.115$ ,  $p > 0.000$ ), personal norms ( $\beta = 0.496$ ,  $t = 11.261$ ,  $p > 0.000$ ), and environmental self-identity ( $\beta = 0.429$ ,  $t = 10.132$ ,  $p > 0.000$ ). Hence, H5, H6, and H7 are supported. Consumption values have a significant effect on personal norms ( $\beta = 0.790$ ,  $t = 42.488$ ,  $p > 0.000$ ), which has a significant impact on environmental self-identity ( $\beta = 0.304$ ,  $t = 4.970$ ,  $p > 0.000$ ). Thus, H8 and H9 are supported.

Furthermore, in the evaluation of influential factors in consumers' innovative green product adoption, environmental attitude ( $\beta = 0.831$ ,  $t = 45.363$ ,  $p > 0.000$ ), personal norms ( $\beta = 0.3541$ ,  $t = 6.928$ ,  $p > 0.000$ ), and environmental self-identity ( $\beta = 0.298$ ,  $t = 6.1013$ ,  $p > 0.000$ ) are determined to have significant effects, as shown in Table 3. Thus, H10, H12, and H13 are supported. However, there is not a significant impact of consumers' consumption values on innovative green product adoption ( $\beta = 0.092$ ,  $t = 1.789$ ,  $p > 0.074$ ). Hence, H11 is not supported. These results may suggest that consumption values should indirectly influence innovative green product adoption through personal norms (ethical norms). Finally, another proposition in this study is that perceived social responsibility serves as a moderator that can accelerate the influence of consumption values and personal norms on

innovative green product adoption. The results indicate that consumers' perceived social responsibility can serve as a significant moderator strengthening the influence of personal norms on innovative green product adoption ( $\beta = 0.113$ ,  $t = 2.145$ ,  $p > 0.035$ ). However, the moderating effect does not significantly support the values for consumer consumption ( $\beta = 0.086$ ,  $t = 1.652$ ,  $p > 0.091$ ).

**Table 3.** Results of direct effects.

Hypothesis	Path	Standardized Estimate	<i>t</i>	<i>p</i>	Remarks
H1	GMS → EA	0.805	40.041	0.000	Supported
H2	GMS → CV	0.702	8.998	0.000	Supported
H3	GMS → PN	0.287	5.879	0.001	Supported
H4	GMS → ESI	−0.066	1.291	0.197	Not supported
H5	EA → CV	0.542	15.115	0.000	Supported
H6	EA → PN	0.496	11.261	0.000	Supported
H7	EA → ESI	0.429	10.132	0.000	Supported
H8	CV → PN	0.790	42.488	0.000	Supported
H9	PN → ESI	0.304	4.970	0.000	Supported
H10	EA → IGA	0.831	45.363	0.000	Supported
H11	CV → IGA	0.092	1.789	0.074	Not supported
H12	PN → IGA	0.354	6.928	0.000	Supported
H13	ESI → IGA	0.298	6.103	0.000	Supported
H14b	CN*PSR*IGA	0.086	1.652	0.091	Not supported
H14a	PN*PSR*IGA	0.113	2.145	0.035	Supported

GMS, green marketing stimuli; EA, environmental attitude; CV, consumption values; PN, personal norms; ESI, environmental self-identity; PSR, perceived social responsibility; IGA, innovative green product adoption.

## 5. Conclusions and Implications

### 5.1. Research Conclusions

This paper is premised on the development of an integrative model to explain the antecedents, mediators, and moderators of consumers' adoption of innovative green products. The results of the theoretical examination and hypothesis testing yield several conclusions. First, green marketing activities have a direct impact by promoting an environmental attitude and consumption values and building personal (ethical) norms. These results are in line with those of previous studies. Through green marketing, consumers may be convinced to recognize the environmental crisis [32] and become involved in this issue by expressing their environmental concerns [45,52]. It has been argued that green marketing activities also have a positive impact on personal norms [67], which may increase people's willingness to make economic sacrifices in order to avoid negative environmental impact. As these results suggest, employing marketing activities allows firms to change customers' attitudes toward environmental concerns, increase consumption values toward green products, and promote personal norms about environmental issues. However, a direct impact of marketing activities on consumers' environmental self-identity is not supported. Thus, this result is subject to further validation.

Second, environmental attitude has a direct effect on consumption values, personal norms, and environmental self-identity, and consumption values and environmental self-identity have a direct effect on personal norms. These results are in line with those of previous studies. Consumers tend to have an increased awareness of the consequences of environmental deterioration [45]. Attitude is a powerful factor in promoting consumers' green consumption values [51], which triggers a sense of ethical obligation and social

responsibility (personal norms) [36,38]. Moreover, consumers with a high degree of green self-identity are likely to have a high level of ethical norms [53].

Third, regarding the factors that influence consumers' adoption of innovative green products, environmental attitude, personal norms, and environmental self-identity are critical elements. This result is in line with the findings of previous studies. Individuals with a strong environmental attitude tend to focus on environmental protection, which results in a high degree of innovative green product adoption [52]. Furthermore, high green consumption values can result in a high degree of innovative green product adoption [5]. Consumers with a high level of personal norms are more likely to willingly sacrifice themselves and feel a sense of moral obligation around pro-environment consumption, thereby further promoting innovative green product adoption [52].

Finally, the moderating role of perceived social responsibility in innovative green product adoption is confirmed in this study. The results suggest that under a high level of perceived social responsibility, the influence of personal norms on innovative green product adoption is significantly amplified. This result was verified in previous studies. Consumers' perceived social responsibility is a result of their concerns about environmental issues when evaluating certain purchases [49]. Thus, the positive phenomenon of the moderating effect of perceived social responsibility can be interpreted to mean that perceiving a strong social responsibility toward green products will contribute to strengthening consumers' personal norms, which in turn will strengthen their innovative green product adoption [12].

### 5.2. Academic Implications

The findings of this study have several academic implications. First, to fill the gap in the literature, the study presents an integrative model of innovative green product adoption incorporating various theories. First, the S-O-R model [14] was used to explain how green marketing stimuli can influence aspects of the organism (environmental attitude, green consumption values, personal norms, and environmental self-identity) that engender innovative green product adoption. Moreover, green consumption value theory was adopted to clarify how consumption values can drive consumers' choices and decisions [8]. Value-belief-norm theory was adopted to explain the influential chain of attitude → values → norms → self-identity [19]. As stated, green consumption values can significantly influence consumers' personal or ethical norms around their responsibility to address or resolve environmental deterioration [20]. The concept of perceived social responsibility was similarly utilized to explain its moderating role in the influence of green consumption values and personal norms on innovative green product adoption [12].

Although the issues of innovative green product adoption have become increasingly important, only a few studies have developed comprehensive models to explain its antecedents, mediators, and moderators. This study offers an opportunity to extend the scope of the investigation by introducing additional theories and models to verify the applicability of the research models.

### 5.3. Managerial and Policy Implications

The study findings also have several managerial implications. First, business managers should be aware of the influential role of green marketing activities in consumers' environmental attitude, green consumption values, personal norms, environmental self-identity, and innovative green product adoption. Environmental issues have attracted the attention of people and companies across the world, hence green marketing is a critical tool for promoting consumers' innovative green adoption. In this regard, managers should design an effective marketing mix (in terms of green pricing, products, channels, and promotions) to fit the needs of environmentally aware customers.

Second, given that environmental attitude, green consumption values, personal norms, and environmental self-identity function as full mediators facilitating the influence of green marketing on innovative green product adoption, marketing managers should carefully promote these mediators by implementing green marketing activities. Furthermore, the

sustainability issue has become increasingly important, and green marketing and innovative green product adoption have become critical to satisfy customer needs, hence business managers should focus on identifying consumers' perceived social responsibility in order to expand the influence of personal norms on innovative green product adoption.

Third, the research model developed in this study should provide an essential reference for business managers to develop green marketing activities. Specifically, marketers and managers should design an effective marketing mix to elicit consumers' positive attitude toward environmental protection and increase their sense of value around environmentally friendly consumption. Managers should enhance their understanding of the direct effect of attitude and consumption values on personal norms and environmental self-identity. The study findings similarly have implications for policymakers, who could modify their policies to enhance green purchase intention. Marketers and managers should also emphasize public communication about environmental issues and provide relevant recommendations and guidelines. Finally, marketers and managers should intensify their focus on promoting consumers' perceived social responsibility in order to enable consumers to take actions to increase their adoption of innovative green products.

Finally, the results of this study have several policy implications. Since green marketing activities have a significant impact on environmental attitude, consumption values, ethical norms, and self-identity, it is essential for firms to prioritize the design of formal green policies for employees and customers. It is also important for government sectors to offer incentives and green building policies to enhance green adoption.

#### *5.4. Limitations and Future Research Directions*

The existence of a relationship between green marketing, environmental attitude, green consumption values, personal norms, environmental self-identity, and innovative green product adoption has been verified in this study. However, the study has some limitations, which may encourage further validation. First, a comprehensive model incorporating the antecedents, mediators, and moderators of consumers' innovative green product adoption was developed in this study, but several variables might have been omitted. Future research should identify other critical variables (e.g., personal traits, social influence, perceived psychological benefits) that affect consumers' green choices. Second, although this study identified some mediators to explain the bridging effect between antecedents and green adoption, their role in terms of full or partial mediation was not included. Future research could concentrate on this issue to deepen our understanding of the mediating role of these variables. Third, convenient sampling was used in this study to collect data from customers with green purchase experience as the qualified sample; however, the number of respondents (349) may be insufficient to represent the entire population of green consumers. Future research could collect more data on consumers with diverse demographic backgrounds and types of experience. Fourth, the research sample in this study included customers with green product purchasing experience, whereas customers without such experience were neglected. Future research could test the difference in opinions between these two groups. Finally, the customers in this study were asked to provide opinions based on general types of green products rather than specific green brands. Thus, the conclusions may be diluted due to the eradication of general products. Future studies could test this research model with specific green product brands.

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