

# An Empirical Comparison of Alternative Models of Consumers' Environmental Attitudes and Eco-friendly Product Purchase Intentions\*

**JUNYONG KIM\*\***

*Hanyang University ERICA  
Kyeonggi-do, Korea*

## ABSTRACT

Using two sets of survey data collected in Korea and the United States respectively, this study demonstrated that the model that integrated the value-attitude-behavior hierarchy chain and the theory of planned behavior had the highest fit with both sets of the data than other models of consumers' environmental attitudes and eco-friendly product purchase intentions. The findings also showed that incorporating the effects of various types of perceived values of eco-friendly products (e.g., environmental, functional, and economic values) into the model did not improve the model fit, although products' environmental value had significant interaction effects with some of the non-environmental values.

**Keywords:** eco-friendly product, purchase intention, value-attitude-behavior chain, theory of planned behavior, synthetic models

## INTRODUCTION

For decades, marketing practitioners and scholars predicted that addressing consumers' increasing concerns about environmental impacts of business activities and products will become a major challenge for businesses (Czinkota and Skuba 2009; Grant 2007;

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\*\* Professor of Marketing, Division of Business, College of Business and Economics, Hanyang University ERICA, 55 Hanyangdaehak-ro, Sangnok-gu, Ansan, Kyeonggi-do, 15588, Korea. Tel: 82-31-400-5623, Fax: 82-31-400-5591, Email: junykim47@hanyang.ac.kr.

Henion 1981; Kassarijian 1971; Kotler 2011; Ottman 2011; Rao 1974; Zimmer, Stafford, and Stafford 1994). Moreover, consumers have indicated that they would buy and even pay more for eco-friendly products in responses to a myriad of consumer surveys (e.g., Banikarim 2010; Ferguson and Goldman 2010; The Nielsen Company 2015).

However, consumers' actual patronage of eco-friendly products has been far below what businesses had expected, and it has gone through cycles of ups and downs as market conditions changed (Horne 2009; Johnstone and Tan 2015; Neff 2010). This discrepancy between consumers' attitudes and actual behaviors puts businesses in a quandary. That is, while consumers' growing concerns for the environment increased the societal pressure for companies to enhance ecological sustainability of their operations and market offerings, businesses are not sure that consumers will reward their pro-environmental efforts and investments in the marketplace.

Fortunately, some pro-environmental changes in business practices and operations pay off themselves through resource savings or cost reductions (Lovins, Lovins, and Hawken 1999). However, for most of such changes and investments them to be sustainable, businesses need consumers' supports in the forms of broad adoption of eco-friendly offerings and active patronage for pro-environmental business practices. Therefore, it is crucial for companies to devise and implement effective marketing activities that can bring about those supports.

To devise and implement effective marketing activities, companies first need to understand what factors determine consumers' propensity to adopt eco-friendly products and how those factors interact or combine with each other. Then, they also need to know where consumers stand regarding those factors accurately. To help businesses' in that regards, many scholars have proposed various models of consumers' eco-friendly products adoption process. However, unfortunately, many of the existing models are incomplete, devoid of solid theoretical foundation, or inconsistent with each other in some cases. These shortcomings of the existing models hinder businesses' accurate diagnosis of what needs to be done to increase consumers' eco-friendly products adoption.

The purpose of this article is to enhance the business community's understanding of consumers' eco-friendly products adoption process by proposing a more theoretically grounded and complete model of

the process. For that purpose, this article starts with a brief review of the existing theories and models of consumers' eco-friendly products adoption process. Then, it proposes alternative models by integrating and supplementing the existing models and tests the validity and the superiority of the models by fitting the models to the two sets of survey data collected from adult consumers in the U.S. and Korea separately. Then, this article discusses the findings regarding how to improve the effectiveness of policies and marketing and activities aimed at increasing consumers' adoption of eco-friendly products.

## **THEORETICAL BACKGROUND**

### **Determinants of Pro-Environmental Consumer Behaviors**

#### *Demographic and Psychographic Factors*

As Kilbourne and Beckmann (1998) summarized, the early research focused on profiling the segments of consumers who are more likely to engage in pro-environmental behaviors and purchases eco-friendly products based on consumers' demographics and psychographic characteristics such as gender, age, education level, income, personality, and so on. However, although some studies found differences in consumers' propensity to behave in pro-environmental manners based on these factors, a majority of research concluded that demographic and psychographic factors have only limited usefulness in predicting and explaining consumers' pro-environmental behaviors and eco-friendly products purchases (Englis and Phillips 2013; Jain and Kaur 2006; Laroche, Bergeron and Barbaro-Forleo 2001; Lee 2009; Mills and Schleich 2010; Moon et al. 2002; Paço and Raposo 2010; Pinto et al. 2011; Shrum, McCarty, and Lowrey 1995; Schlegelmilch, Bohlen, and Diamantopoulos 1996; Straughan and Roberts 1999).

#### *Environmental Values, Beliefs, and Attitudes*

In turn, researchers set to explore the effects of consumers' environmental consciousness, values, and attitudes which are more specifically related to eco-friendly products adoption. The research in this vein not only found that these factors influence consumers' propensity to engage in pro-environmental behaviors substantially,

but also showed that, consistent with Ajzen's (1991) notion of context-specificity of attitudes, consumers' more context-specific beliefs and attitudes regarding particular eco-friendly products are more predictive of purchase intentions for the products than consumers' general environmental values, beliefs, and attitudes (Barbarossa and de Pelsmacker 2016; Lee 2009; Schlegelmilch et al. 1996; Stern et al. 1999; Chan and Lau 2000; Jansson, Marell, and Nordlund 2010; Kates 2001; Mostafa 2007; Paço et al. 2013; Gerpott and Mahmudova 2010; Junaedi and Shellyana 2007).

#### *Perceived Behavioral Control or Self-efficacy*

Another determinant of consumers' pro-environmental behaviors explored by many researchers is consumers' beliefs about their knowledge and ability to successfully conduct effective pro-environmental actions, suggested by Ajzen's (1991) theory of planned behavior. Different researchers have diversely termed this factor as environmental knowledge, perceived environmental self-efficacy, an internal environmental locus of control, or perceived behavioral control. Despite the diversity of the terminology, researchers who looked into the effects of these factors related to consumers' self-perceived ability and efficacy of successfully performing pro-environmental behaviors consistently found that they are positively linked to the consumers' propensity to engage in the behaviors (Chan and Lau 2000; Cleveland, Kalamas, and Laroche 2005, 2012; Gupta and Ogden 2009; Jansson, Marell, and Nordlund 2010; Junaedi and Shellyana 2007; Kalamas, Cleveland, and Laroche 2014; Kates 2001; Mostafa 2007; Tucker et al. 2012).

#### *Social Norms and Reference Group Influences*

In line the theories of social normalization and social practice (Schatzki and Wittgenstein 1996; Warde 2005), researchers also examined the effects of social factors such as reference groups' pro-environmental behaviors or beliefs about them and the governmental policies which make pro-environmental behaviors as normal or desirable. These researchers consistently reported substantial effects of these social factors on pro-environmental consumer behaviors (Carson and Roth 2009; Connell 2010; Gallagher and Muehlegger 2011; Gerpott and Mahmudova 2010; Gupta and Ogden 2009; Kim, Lee, and Hur 2012; Lavergne et al. 2010; Ohtomo and Hirose 2007; Oliver and Lee 2010; Rettie, Bruchell, and Riley 2012; Stern 2000;

Welsch and Kühling 2009).

#### *Non-environmental Product Characteristics*

Yet another group of factors that have been explored by many researchers are consumers' beliefs of non-environmental characteristics of eco-friendly products such as functional performance and quality, economic costs and savings, emotional or hedonic appeals, and convenience of buying them (Choi and Ng 2011; Dembkowski and Hanmer-Lloyd 1994; Essoussi and Linton 2010; Gerpott and Mahmudova 2010; Hartmann and Apaolaza-Ibanez 2012; Koller, Floh, and Zauner 2011; Lin and Huang 2012; Mainieri et al. 1997; Mills and Schleich 2010; Papista, and Krystallis 2013; Olson 2013; Pickett-Baker and Ozaki 2008; Rios et al. 2006; Straughan and Roberts 1999; Thøgersen 2011).

How these factors influence consumers' propensity to adopt eco-friendly products are of particular interests to businesses because they are directly related to controllable marketing decision variables such as prices and distributions. However, the effects of these non-environmental product characteristics of eco-friendly products reported by the past studies have been inconsistent. For example, Rios et al. (2006) found that products' functional attributes had greater effects on consumers' choices than the products' environmental attributes. However, Lin and Huang (2012) found that the novelty-based hedonic value of an eco-friendly product affected consumers' choices but the products' functional and economic values did not. Moreover, Gerpott and Mahmudova (2010) found that the relative impacts of environmental, economic, social, and functional values of eco-friendly products (i.e., green energy electricity) varied depending on consumers' actual consumption levels. Olson (2013) reported additive, or subtractive, effects of environmental benefits and non-environmental attributes like prices and quality.

On the one hand, the inconsistency in the findings suggests that the absolute and relative impacts of products' environmental and non-environmental characteristics may vary depending on various consumer-related factors like their environmental attitudes and knowledge, as well as on the product category factors like the degree of product differentiation or substitutability). On the other hand, the inconsistency can also be attributed to the differences in how the effects of various, environmental and non-environmental

product-related values have been conceptually specified and tested by different researchers. The followings section discusses the latter issue in more details.

### **Connecting Dots: Linking Consumers' Environmental Attitudes and Behavioral Intentions**

As researchers identified various determinants of consumers' eco-friendly products adoption and other pro-environmental behaviors, they also proposed a variety of models in which they integrated the effects of multiple determinants. Following the tradition of the theory of planned behavior (Ajzen 1991), some of those models posited independent and additive effects of various factors such as one's attitudes towards pro-environmental behaviors, perceived behavioral control, and subjective norms about the behaviors on the purchase intentions for eco-friendly products (e.g., Hale, Householder, and Greene 2003; Jansson et al. 2010). Alternatively, other researchers connected those factors through a hierarchical causal chain model similar to Vinson, Scott, and Lamont's (1977) hierarchy of value-attitude-behavior model (e.g., Claudy, Peterson, and O'Driscoll 2013; Koller, Floh, and Zauner 2011; Stern 2000).

While the models based on the theory of planned behavior (Ajzen 1991) are parsimonious, they do not consider the causal relationships between consumers' attitudes, behavioral efficacy, and perceived social norms explicitly, though the interrelatedness of these factors is assumed. Moreover, these models do not provide sufficient insights into when and why the gaps between consumers' attitudes toward buying eco-friendly products and their actual behaviors occur. In contrast, the hierarchical models explicitly consider the interrelatedness of the factors in the models and provide an explanation for why the gaps between consumers' general environmental attitudes or beliefs and their behaviors (Stern 2000). That is, according to these models, many mediating factors intervene the effects of consumers' general values and beliefs on their actual behaviors. Therefore, such a gap is to arise if any of the intervening links within the chain breaks. However, the hierarchical chain models typically do not explicitly consider the direct effects of all the mediating factors within the chain on consumers' behavioral intentions.

In recognition of the incompleteness of these models, Kumar,

Manrai, and Manrai (2017) recently proposed an integrated model that is based on the theory of planned behavior but additionally specified the moderating and mediating effects of attitude, knowledge and social norms on each other like in the hierarchical chain models. However, the relative fit of such integrated model over the two more parsimonious models has not been tested to the best of the author's knowledge.

As for why the links within an attitudinal causal chain may break, researchers noted the contextual or moderating roles various product-related factors such as non-environmental product values or physical and monetary availability and some consumer factors like their skills, knowledge, habits, social influences play at different links within the attitudinal chain. Hence, researchers proposed synthetic or hybrid models which incorporated some non-attitudinal factors into the attitudinal causal chains as moderators of different links within the attitudinal chain (e.g., Dembkowski and Hanmer-Lloyd 1994; Stern 2000).

However, these models differ from each other, as well as from the more traditional models, not only regarding what particular factors are included into the models but also regarding how they specified the additional factors in the chain models. For example, Dembkowski and Hanmer-Lloyd (1994) incorporated various non-attitudinal factors like perceived social pressure, perceived environmental relevance of products, consumer knowledge, prices, the convenience of buying, and other situational barriers as the moderators of different causal links within a consumer's value-attitude-behavior chain. However, Stern and his colleagues incorporated consumer's perceived ability to reduce the environmental threat and perceived norm as the intermediate nodes within the value-belief-norm (VBN) chains. To be more specific, they postulated causal links from one's ecological attitudes to perceived ability and from perceived ability to perceived norm (Stern 2000; Stern, Dietz, and Guagnago 1995; Stern et al. 1999).

Interestingly, some researchers recently proposed different versions of models that specified attitudinal factors, which many scholars traditionally conceived to be the main causal factors within a value-attitude-behavior chain, as the moderators of the links between product-related factors and consumers' behavioral intentions. For instance, Koller et al. (2011) treated consumers' general attitude toward environmental protection as a moderator of

the relationship between perceived product values and consumers' loyalty intentions. Likewise, Papista and Krystallis (2013) specified consumers' attitudes and efficacy-related factors as the moderators of the relationships between various types of product values (e.g., ecological, functional, economic, social, and hedonic values) and the perceived total value of a green brand in their model. Moreover, some studies demonstrated that consumer's assessments environmental value of eco-friendly products, as well as the evaluation process, may be influenced by consumers' environmental motivation and knowledge (Thøgersen, Haugaard, and Olesen 2010; Thøgersen, Jorgensen, and Sandager 2012). These effects are quite in line with the tenets of the elaboration likelihood model (Petty and Cacioppo 1994).

The differences in how the existing models specified the interrelationships between various determinants of consumers' pro-environmental behaviors including eco-friendly product purchases can be partly attributed to the fact that different researchers adopted different theoretical frameworks in developing the models and each model may well have a good theoretical foundation despite the differences. However, aside from the question of theoretical soundness of each model, the conceptual differences in the models might be liable for the inconsistency in empirical findings and, thus, hinder businesses' accurate understanding of what matters in increasing consumers' eco-friendly products adoption. Even more problematic, given the inconsistency of past empirical findings, is the fact that the different models have almost never had been fitted to the same data, and that some models have never been empirically tested.

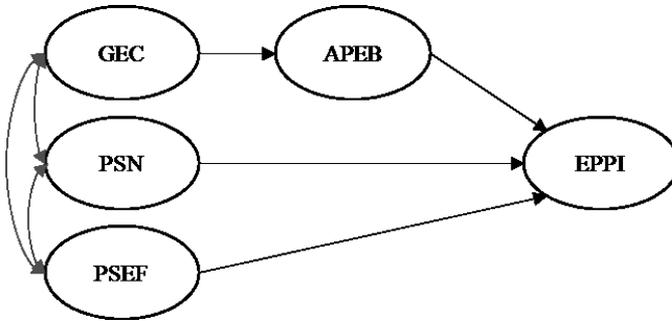
The lack of empirical comparison of the different existing models is troubling because such testing is imperative for businesses to be able to choose the best model in their endeavors to accurately understand what needs to be done to increase consumers' eco-friendly products adoption. Therefore, in an attempt to address the shortcomings of the extant models and empirical studies described above, this article presents some alternative models which theoretically integrate and supplement the existing models and compares their relative fits, together with those of the existing models, by fitting them to common data.

## EMPIRICAL STUDY

### Specifications of Alternative Models

For empirical comparison of the alternative models, this study takes a two-step approach. In the first step, three models which differ in terms of how the effects of and the relationships between consumers' general environmental concerns (GEC), attitudes towards pro-environmental behaviors (APEB), perceived self-efficacy for the behaviors (PSEF), and perceived social norms (PSN) on eco-friendly products purchase intentions (EPPI) are specified. The first model (model 1-a), depicted in figure 1, is based on the theory of planned behavior (Ajzen 1991) and specifies the additive effects of attitudes towards pro-environmental behaviors (APEB), perceived self-efficacy for the behaviors (PSEF), and perceived social norms (PSN). The second model (model 1-b), depicted in figure 1, is a hierarchical chain model based on Stern's (2000) value-beliefs-norm model. The third model (model 1-c), illustrated in figure 1, integrates the first and second models. The third model also specifies additional paths from consumers' general environmental concerns to perceived self-efficacy and eco-friendly products purchase intentions and the path from attitudes towards pro-environmental behaviors to perceived social norms.

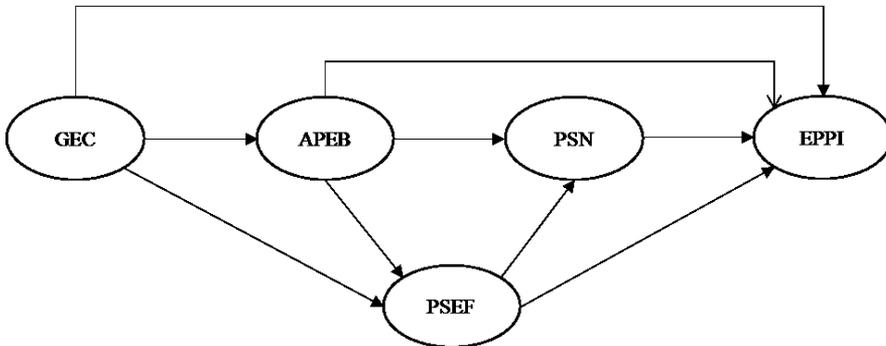
In the second step, several versions of extended models that augment the model that exhibits the best fit in Step 1 by specifying various effects of five types of perceived values associated with eco-friendly products differently are compared. The five types of perceived values are: environmental value (ENV), functional value (FUNC), economic value (ECON), hedonic value (HED), and convenience value (CONV). The first model explored in the second step (model 2-a), depicted in figure 2, augments the base model by adding the independent and parallel effects of various perceived values on purchase intentions to the base model. The second model (model 2-b), depicted in figure 2, additionally specifies the moderating effects of consumer's attitudes towards pro-environmental behaviors and perceived self-efficacy on the effects of various eco-friendly products values on purchase intentions (Koller et al 2011; Papista and Krystallis 2013), as well as the direct effects of the perceived product values. The third model (model 2-c),



**Model 1-a) TPB-based Model (Ajzen 1991)**



**Model 1-b) VBN Hierarchical Chain Model (Stern 2000)**



**Model 1-c) Integrated Model**

**Figure 1. Alternative Models Examined in Step 1**

depicted in figure 2, specifies the causal paths from consumers' attitudes towards pro-environmental behaviors, perceived social norm, and perceived self-efficacy to perceived environmental value of eco-friendly products, to the first model (model 2-a). This model incorporates the tenet of the elaboration likelihood model that consumers' evaluations of environmental benefits of eco-friendly products are affected by their intrinsic and extrinsic motivations

and ability to evaluate them (Dembkowski and Hanmer-Lloyd 1994; Petty and Cacioppo 1994; Thøgersen, Haugaard, and Olesen 2010; Thøgersen, Jørgensen, and Sandager 2012). The fourth model (model 2-d), depicted in figure 2, specifies the interaction effects of perceived environmental value of eco-friendly products and the other types of product values, incorporating the proposition that non-environmental characteristics of eco-friendly products moderate the effect of environmental values of eco-friendly products, as well as their direct effects, on purchase intentions, following the proposition and the empirical findings from the past studies (e.g., Dembkowski and Hanmer-Lloyd 1994; Olson 2013).

## **Surveys**

### *Samples and Procedures*

Two sets of same consumer surveys were conducted in the United States and Korea separately. In the United States, adult family members and co-workers of 94 undergraduate and graduate students enrolled in a business school at a university located within the Midwest region were contacted. In Korea, adult family members and co-workers of 86 undergraduate and graduate students enrolled in a business school at a university located in the vicinity of the capital city were contacted for responses. In both countries, the students informed the prospective respondents of the upcoming online survey a week before the survey opened up. Then, the students delivered the addresses for the on-line survey to the prospective respondents via email and text message, and the on-line surveys remained open for two weeks. The students sent a reminder message to each of the prospective respondents three days before the on-line surveys closed.

A total of 464 respondents completed the online questionnaires in the United States, and a total of 519 respondents completed the questionnaire in Korea. However, eight responses from the U.S. sample and ten responses from the Korean sample were discarded because they were suspected to be of low validity. As shown in table 1, the remaining 456 U.S. respondents and 509 Korean respondents were similar to each other regarding the distributions of age, gender, and highest education completed.

**Table 1. Respondents Profiles**

	US		KOR	
	Frequency	Percent	Frequency	Percent
Gender				
Male	235	51.5	249	48.9
Female	221	48.5	260	51.1
Total	456	100	509	100
Age				
18 to 24 years	133	29.2	166	32.6
25 to 34 years	120	26.3	130	25.5
35 to 44 years	67	14.7	72	14.1
45 to 54 years	90	19.7	99	19.4
55 to 64 years	46	10.1	42	8.3
Total	456	100	509	100
Highest Education Completed				
High School / GED	236	51.8	298	58.5
College Degree	181	39.7	177	34.8
Master's Degree	25	5.5	24	4.7
Doctoral Degree	8	1.8	6	1.2
Professional Degree (JD, MD)	6	1.3	4	0.8
Total	456	100	509	100

### Questionnaire

The survey questionnaire was devised to measure the constructs respondents' general environmental concerns; attitudes towards pro-environmental behaviors; perceived self-efficacy of buying eco-friendly products; perceived social norms about buying eco-friendly products; perceived environmental, economic, functional, hedonic, and convenience values of eco-friendly products; and intentions to adopt eco-friendly products. Several demographic characteristics of the respondents (gender, age, the highest level of education completed, occupation, and annual household income) were also measured.

The respondent's general environmental concern was measured by two scale items: "Environmental problems such as water and air pollutions are real issues" and "I am very concerned with climate changes." The respondent's attitude towards pro-environmental behaviors was measured by three scale items: "It is important to recycle or reuse things whenever possible," "I am willing to change

my current lifestyle if it helps to protect the environment,” and “It is important to look for environmentally safer products when shopping.” The respondent’s perceived self-efficacy of buying eco-friendly products was measured by two scale items: “I am knowledgeable enough to identify truly environmentally friendly products” and “I can evaluate environmental benefits of products with confidence.” Perceived social norm about buying eco-friendly products was measured by two scale items: “Buying eco-friendly products is a socially responsible thing to do” and “Eco-friendly lifestyle is becoming more and more popular among the cool people.”

Perceived environmental value of eco-friendly products was measured by three scale items: “Eco-friendly products help reduce wastes and pollution,” “Eco-friendly products help preserve biodiversity,” and “Eco-friendly products are safer for the environment than other products.” Perceived economic value of eco-friendly products was measured by two scale items: “Eco-friendly products help me save money” and “Eco-friendly products cost more than other products (reversed).” Perceived functional value of eco-friendly products was measured by a single scale item: “Eco-friendly products are superior to other products in performance or quality.” Perceived hedonic value of eco-friendly products was measured by a single scale item: “Eco-friendly products are superior in design or style to other products.” Perceived convenience value (i.e., the convenience of buying) of eco-friendly products were measured by a single scale item: “Eco-friendly products are not widely available in stores (reversed).”

Finally, the respondents’ intentions to adopt eco-friendly products were measured by their intentions to buy eco-friendly alternatives in seven product categories (i.e., stationery, food, household cleaning products, home electronics and appliances, furniture and home furnishing products, gardening and landscaping products, and auto vehicles). Each respondent’s intention to buy an eco-friendly alternative in each product category was measured by a single scale item, “I intend to buy an eco-friendly alternative in this product category the next time I purchase the product.” All measurement items were 5-point scales anchored by “Definitely Not (1)” and “Definitely (5).”

All constructs, except those measured by a single item, were regarded as formative constructs since each measurement item evaluated different and non-interchangeable aspects of the

corresponding constructs (Fornell and Bookstein 1982; Jarvis, MacKenzie, and Podsakoff 2003). Hence, all constructs with multiple causal indicators were operationalized as the average ratings of the groups of relevant scale items (Spreng and Chiou 2002; Dong et al. 2014).

## Results

### Model Comparisons

For model comparison for the first step, path analyses of the TPB-based model (model 1-a), the VBN-based hierarchical chain model (model 1-b), and the integrated model with additional paths (model 1-c) were conducted using LISREL 8.8. Table 2 presents the results from the path analyses.

As shown in table 2, the TPB model (model 1-a) had an acceptable (CFI = .925, IFI = .926, SRMR = .059) or a poor (RMSEA = .182) fit with the Korean data, judging by the commonly accepted rule-of-thumb criteria for interpreting the indices (Hoe 2008; Schermelleh-Engel et al. 2003). It also exhibited an acceptable (CFI = .904, IFI = .905) or a poor (SRMR = .105, RMSEA = .221) fit with the U.S. data. However, the hierarchical chain model (model 1-b) had a poor fit with both the Korean data (CFI = .849, IFI = .850, SRMR = .143, RMSEA = .178) and the U.S. data (CFI = .800, IFI = .801, SRMR = .123, RMSEA = .205). To the contrary, the integrated model with additional paths (model 1-c) had a very good fit with both the Korean data (CFI = .999, IFI = 0.999, SRMR = .001, RMSEA < .001) and the U.S. data (CFI = .999, IFI = .999, SRMR = .001; RMSEA = .040).

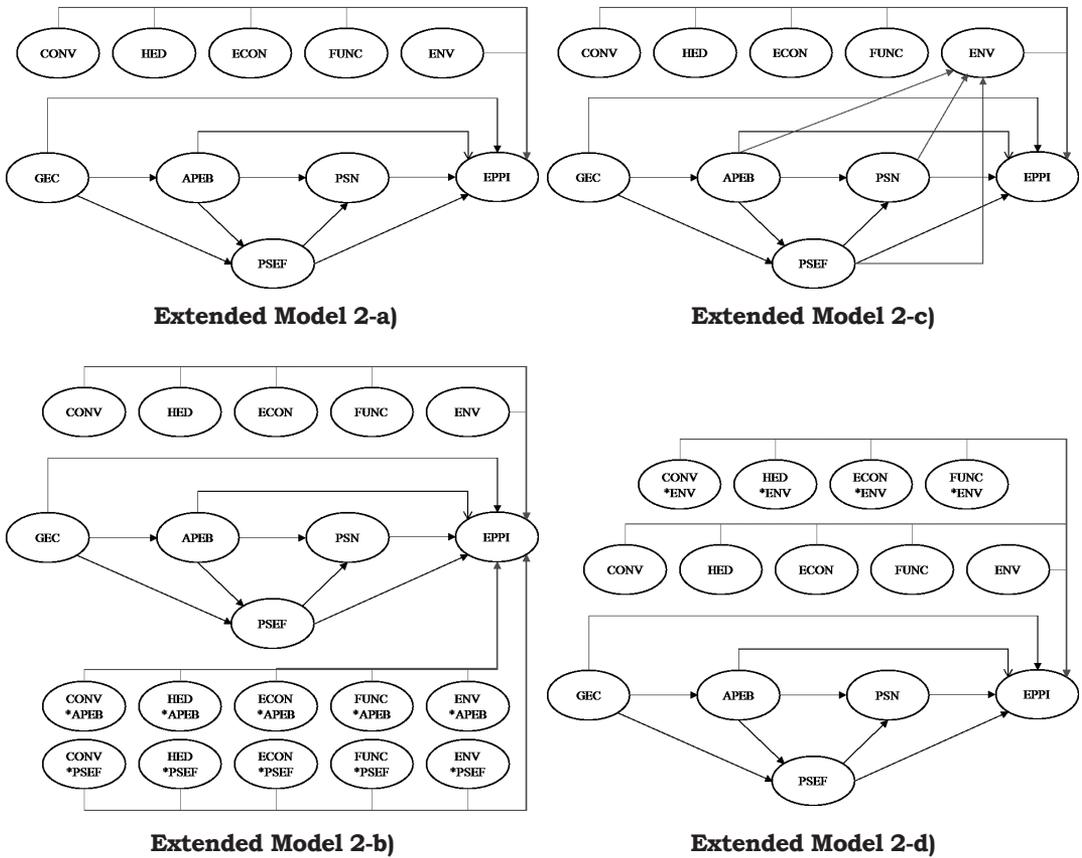
**Table 2. Model Fit Comparisons for Base Models**

KOR								
Model	Chi-square (df)	CFI	GFI	IFI	RMSEA	SRMR	AIC	ECVI
1-a)	53.729 (3)	0.925	0.959	0.926	0.182	0.059	77.729	0.153
1-b)	102.457 (6)	0.849	0.925	0.850	0.178	0.143	120.457	0.237
1-c)	0.019 (1)	0.999	0.999	0.999	0.000	0.001	28.019	0.059
US								
Model	Chi-square (df)	CFI	GFI	IFI	RMSEA	SRMR	AIC	ECVI
1-a)	77.290 (3)	0.904	0.943	0.905	0.221	0.105	101.290	0.199
1-b)	133.539 (6)	0.800	0.905	0.801	0.205	0.123	151.539	0.298
1-c)	1.799 (1)	0.999	0.999	0.999	0.040	0.009	29.799	0.059

Further comparison of the three models based on Akaike information criterion (AIC) (Westland 2015) indicated that the integrated model (model 1-c) had the lower AIC value of 28.019 compared to the AIC values of the hierarchical chain model (AIC = 120.457) and the TPB-based model (AIC = 77.729) for the Korean data. The integrated model also had the lower AIC value of 29.799 compared to the AIC values of the hierarchical chain model (AIC = 151.539) and the TPB-based model (AIC = 101.290) for the U.S. data. In addition, the results of chi-square difference tests comparing the integrated model with the TPB-based model (KR:  $\Delta x^2 = 53.710$  (2),  $p < .001$ ; US:  $\Delta x^2 = 75.491$  (2),  $p < .001$ ) and the hierarchical chain model (KR:  $\Delta x^2 = 102.438$  (5),  $p < .001$ ; US:  $\Delta x^2 = 131.74$  (5),  $p < .001$ ) also indicated the integrated model was superior to the other models for both samples. These findings indicated that the integrated model fit the data significantly better than the other models did.

Therefore, the extended models to be compared in the second step were constructed by adding the paths that represent the various roles perceive environmental (ENV), functional (FUNC), economic (ECON), hedonic (HED), and convenience (CONV) values are supposed to play according to the past researchers' propositions to the integrated model (1-c). The four models compared in the second step are depicted in figure 2.

The results from the path analyses of for the four models are presented in table 3. As shown in table 3, the first model (2-a), which specified independent and parallel effects of various perceived values of eco-friendly products on eco-friendly products purchase intentions in addition to the base model (1-c), had a poor fit (CFI = .836, IFI = .839, SRMR = .126, RMSEA = .178) with the Korean data. With the U.S. data, this model had an acceptable (CFI = .916, IFI = .918) or a poor (SRMR = .087, RMSEA = .120) fit. The second model (model 2-b), which added the moderating effects of consumer's attitudes towards pro-environmental behaviors and perceived self-efficacy on the effects of various eco-friendly products values on purchase intentions to the first model (2-a), had a poor (CFI = .893, IFI = .897, RMSEA = .115) or acceptable (SRMR = .077) fit with the Korean data. However, this model had a good (IFI = .951, SRMR = .048) or an acceptable (CFI = .948, RMSEA = .076) fit with the U.S. data. The third model (2-c), which specified the paths from consumer's attitudes towards pro-environmental behaviors, perceived self-efficacy, and perceived social norm to perceived



**Figure 2. The Extended Models Examined in Step 2**

environmental value of eco-friendly products in addition to the direct effects of the perceived product values, had an acceptable (CFI = .906, IFI = .908) or a poor (SRMR = .109, RMSEA = .132) fit with the Korean data. This model also had an acceptable (CFI = .919, IFI = .920) or a poor (SRMR = .082, RMSEA = .111) fit with the U.S. data. The fourth model (2-d), which added the interaction effects between perceived environmental value of eco-friendly products and the other product values to the first model (2-a), had a poor (CFI = .866, IFI = .869, SRMR = .097, RMSEA = .142) fit with the Korean data. However, this model had an acceptable (CFI = .924, IFI = .927, SRMR = .065, RMSEA = .091) fit with the U.S. data.

The examination of the AIC values for the four extended models, shown in table 3, also indicated that model 2-c) had the lowest AIC

**Table 3. Model Fit Comparisons for Extended Models**

KOR								
Model	Chi-square (df)	CFI	GFI	IFI	RMSEA	SRMR	AIC	ECVI
2-a)	273.300 (16)	0.836	0.903	0.839	0.178	0.126	351.30	0.692
2-b)	356.515 (46)	0.893	0.934	0.897	0.115	0.077	684.515	1.347
2-c)	177.948 (18)	0.906	0.935	0.908	0.132	0.109	251.948	0.496
2-d)	314.466 (28)	0.866	0.919	0.869	0.142	0.097	468.466	0.922
US								
Model	Chi-square (df)	CFI	GFI	IFI	RMSEA	SRMR	AIC	ECVI
2-a)	133.206 (16)	0.916	0.95	0.918	0.12	0.087	211.206	0.416
2-b)	182.072 (46)	0.948	0.965	0.951	0.0763	0.0483	510.072	1.004
2-c)	131.597 (18)	0.919	0.951	0.92	0.111	0.082	205.597	0.405
2-d)	146.802 (28)	0.924	0.960	0.927	0.0914	0.065	300.802	0.592

value for the Korean data (AIC = 251.948) and the U.S. data (AIC = 205.597). However, the AIC values for the model were significantly larger than those of the base model (1-c), for the Korean data (AIC = 28.019) and the U.S. data (AIC = 29.799). Overall, these findings indicated that incorporating the effects of perceived eco-product values into the integrated model (1-c) did not improve the usefulness of the model.

*Examination of Path Coefficients*

Although it is not the primary focus of this study, the standardized path coefficients for the two samples were examined based upon the model 1-c) which had the strongest fits with the data from both countries. The compositional invariance test based on the method of measurement invariance of composite models (MICOM) (Henseler, Ringle, and Srstedt 2016) confirmed that general environmental concern ( $c$  value = 1.0,  $p$  = .210), attitudes towards pro-environmental behaviors ( $c$  value = 1.0,  $p$  = .459), perceived self-efficacy ( $c$  value = 1.0,  $p$  = .206), perceived social norm ( $c$  value = 1.0,  $p$  = .158), and eco-friendly product purchase intentions ( $c$  value = 1.0,  $p$  = .273) satisfied the criterion for compositional invariance. Thus, the partial measurement invariance is established, allowing the comparison of the standardized coefficients across groups (Henseler, Ringle, and Srstedt 2016).

As shown in figure 3, only one of the nine direct paths specified in the model were statistically insignificant for the U.S. sample. The

direct path that had statistically insignificant path coefficient was the path from perceived social norms (PSN) to eco-friendly product purchase intentions (EPPI) ( $\beta = -.082, t = -1.48$ ). The coefficients for the paths from general environmental concern (GEC) to attitudes towards pro-environmental behaviors (APEB) ( $\beta = .511, t = 10.89$ ), from general environmental concern (GEC) to perceived self-efficacy (PSEF) ( $\beta = .120, t = 2.36$ ), from general environmental concern (GEC) to eco-friendly product purchase intentions (EPPI) ( $\beta = .167, t = 3.42$ ), from attitudes towards pro-environmental behaviors (APEB) to perceived self-efficacy (PSEF) ( $\beta = .309, t = 5.90$ ), from attitudes towards pro-environmental behaviors (APEB) to perceived social norms (PSN) ( $\beta = .241, t = 6.16$ ), from attitudes towards pro-environmental behaviors (APEB) to eco-friendly product purchase intentions (EPPI) ( $\beta = .349, t = 6.47$ ), from perceived self-efficacy to perceived social norms (PSN) ( $\beta = .542, t = 11.98$ ), and from perceived self-efficacy to eco-friendly product purchase intentions (EPPI) ( $\beta = .132, t = 2.44$ ) were statistically significant. In addition, the examination of the total effect of each factor on eco-friendly product purchase intentions revealed that the total effects of general environmental concern ( $\beta = .359, t = 7.67$ ) and attitudes towards pro-environmental behaviors ( $\beta = .356, t = 7.00$ ) were significant but the total effects of perceived self-efficacy ( $\beta = .087, t = 1.94$ ) and perceived social norm ( $\beta = -.082, t = -1.48$ ) were not significant in the U.S. sample.

In the Korean sample, two of the nine direct paths specified in the model were statistically insignificant. The two direct paths that had statistically insignificant path coefficients were the path from gen-

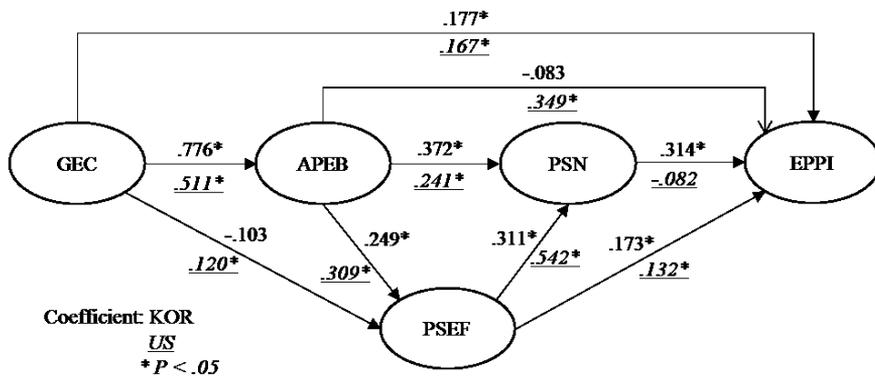


Figure 3. Path Coefficients for Model 1-c)

eral environmental concern (GEC) to perceived self-efficacy (PSEF) ( $\beta = -.103, t = -1.49$ ) and the path from attitudes towards pro-environmental behaviors (APEB) to eco-friendly product purchase intentions (EPPI) ( $\beta = -.083, t = -1.26$ ). The coefficients for the paths from general environmental concern (GEC) to attitudes towards pro-environmental behaviors (APEB) ( $\beta = .776, t = 17.49$ ), from general environmental concern (GEC) to eco-friendly product purchase intentions (EPPI) ( $\beta = .177, t = 2.79$ ), from attitudes towards pro-environmental behaviors (APEB) to perceived self-efficacy (PSEF) ( $\beta = .249, t = 3.56$ ), from attitudes towards pro-environmental behaviors (APEB) to perceived social norms (PSN) ( $\beta = .372, t = 8.90$ ), from perceived self-efficacy to perceived social norms ( $\beta = .311, t = 7.62$ ), from perceived self-efficacy to eco-friendly product purchase intentions (EPPI) ( $\beta = .173, t = 3.97$ ), and the path from perceived social norms (PSN) to eco-friendly product purchase intentions (EPPI) ( $\beta = .314, t = 6.49$ ) were statistically significant. The examination of the total effect of each factor on eco-friendly product purchase intentions revealed that the total effects of perceived social norm ( $\beta = .314, t = 6.46$ ), perceived self-efficacy ( $\beta = .271, t = 6.18$ ), and general environmental concerns ( $\beta = .228, t = 5.21$ ) were statistically significant but the total effect of attitudes towards pro-environmental behaviors ( $\beta = .101, t = 1.51$ ) was not statistically significant in the Korean sample.

The invariance of the path structures across the two samples were tested further by comparing the fit of an unconstrained model, which allows all parameters to be freely estimated for each group, and the fit of the constrained model, which constrains the structural coefficients to be equal across the two samples (Spreng and Chiou 2002; Yoo and Donthu 2002). The result revealed that the unconstrained model had an excellent fit (CFI = .99, IFI = .99, SRMR = .002) and the improvement of the chi-square statistics for the unconstrained model over that of the constrained model ( $\Delta\chi^2 = 79.07$  (2),  $p < .001$ ) were statistically significant. This result confirmed that at least some of the path coefficients were different across the two samples.

A closer comparison of the coefficients and the total effects of the factors indicated that the most notable difference between the two countries is that perceived social norms were the strongest determinant of the respondents' intentions to purchase eco-friendly products for the Korean respondents but insignificant factors for the U.S respondents. To the extent that Korean respondents are rather

collectivistic and the U.S. respondents are more individualistic in nature, the observed difference in the effects of perceived social norms is deemed easily explicable. Similarly, the observed differences that perceived self-efficacy had significant total effect in the Korean sample but not in the U.S. sample could be explained by the fact that the Korean respondents had significantly weaker perceptions of their self-efficacy ( $M = 2.6$ ,  $SD = .86$ ) compared to the U.S. respondents ( $M = 3.0$ ,  $SD = .99$ ) and, thus, the effect of enhancing perceived self-efficacy could be greater for the Korean respondents. However, the reason why attitudes towards pro-environmental behaviors had significant total effect in the U.S. sample but not in the Korean sample is not clear and seem to need further investigation.

## DISCUSSIONS

### Theoretical Contributions and Limitations

The main contribution of this article is that it directly and empirically compared various extant theories and propositions of the process of consumers' eco-friendly products purchase intentions determination by fitting them to the same data and that it proposed an alternative, more integrated model that supplements the inadequacies of each single theory or model. The findings that neither the additive models solely based on the theory of planned behavior nor the hierarchical chain models exclusively based on value-attitude-behavior hierarchy chain theory were adequate in explaining consumers' eco-product purchase intentions in either country.

Instead, the model that integrated the two theories had the good fits with both samples. Moreover, despite few differences across the two countries, path coefficients revealed that most of the factors considered in the study exerted both direct and indirect effects on consumers' intentions to purchase eco-friendly products. These findings indicate that the models based on a single theoretical framework might have failed to explain consumers' eco-friendly products purchase intentions adequately because they did not consider some important direct or indirect relationships among the factors. Therefore, the findings of this study highlight the importance of synthesizing multiple theories and perspectives in or

perspective when trying to understand complex and multifaceted phenomena like human behaviors.

However, when the integrated model was extended further by incorporating the effects of various perceived product values into the model, the overall fit of the model deteriorated although some of the individual the effects of perceived product values were significant. At first glance, this finding may indicate that various perceived values of eco-products, including perceived environmental values, are not strong factors that affect consumers' purchase intentions. However, to the contrary, this finding may suggest that synthesizing the proposed model with a better theoretical framework is necessary to incorporate the effects of the perceived product values properly.

A possible candidate for further integration for that purpose is the green marketing strategy selection framework proposed by Ginsberg and Bloom (2004). Their framework suggests that the relative effectiveness of marketing mix variables for implementing green marketing strategies depends on two factors: (1) the substantiality of the green segments in the market, which is partly determined by the maturity of consumers' environmental beliefs and attitudes, and (2) the differentiability of company's offerings on environmental dimensions, which is determined by a company' resources and competencies to compete on environmental aspects, *as well as consumers' efficacy to discern the differences*, and that businesses choose their strategic emphases accordingly. The first factor is and the second factor (Ginsberg and Bloom 2004, *italics added*).

Their framework suggests that when both the substantiality of green market segments and the differentiability of offerings are low, the appropriate strategy is to create a lower-cost competitive advantage through pro-environmental activities that reduce costs and improve efficiencies, instead of creating competitive advantage based on environmental benefits of offerings (Ginsberg and Bloom 2004). That is, perceived economic values of eco-friendly products, determined by prices and monetary savings of the products, are more influential than perceived environmental values under such a condition. When the substantiality of the green market segment is high but the differentiability of offerings is low, the framework suggests that companies focus on enhancing pro-environmental brand images through public relations and promotion activities such as sponsoring pro-environmental but refrains from advertising environmental benefits of offerings aggressively (Ginsberg and

Bloom 2004). Therefore, a greater impact of perceived hedonic or ethical values of eco-friendly products than of perceived environmental values may be expected under this condition. When the substantiality of the green market segment is low but the differentiability of offerings is high, the framework recommends selective investment into improving perceived environmental values of their offerings combined with promoting functional, economic, or other conventional values of the offerings primarily but promoting environmental benefits as a secondary factor (Ginsberg and Bloom 2004). In essence, their framework suggests that perceived environmental value of eco-friendly products plays a significant role in determining consumers' eco-friendly products purchase intentions only when both factors are high.

Theoretically, Ginsberg and Bloom's (2004) framework suggests the three-way interaction effects of the key factors studied in this study in that the framework suggests that the relative effects of various perceived eco-friendly products values on consumers' eco-friendly products purchase intentions are conditional upon the levels of consumers' environmental attitudes and perceived self-efficacy. In fact, the finding from this study that the model fits of the extended models, which included the effects of perceived values of eco-friendly products, were mostly higher for the U.S. data than the Korean data provides indirect support for Ginsberg and Bloom's (2004) propositions. In the current samples, the U.S. respondents on average had an adequate, though not very high, perceived self-efficacy ( $M = 3.0$ ,  $SD = .99$ ) and fairly positive attitudes towards pro-environmental behaviors ( $M = 3.6$ ,  $SD = .86$ ), similar to the high maturity/high competency segment. On the other hand, the Korean respondents on average had a low perceived self-efficacy ( $M = 2.6$ ,  $SD = .86$ ) but fairly positive attitudes towards pro-environmental behaviors ( $M = 3.6$ ,  $SD = .79$ ), similar to high maturity/low competency segment. Therefore, greater impacts of perceived product values, particularly that of perceived environmental value, were supposed to be observed in the U.S. sample than in the Korean sample according to Ginsberg and Bloom's (2004) propositions.

Still, the individual effects of the perceived values were marginal in both samples. However, it can be attributed to the heterogeneity of the respondents in each sample regarding their attitudes toward pro-environmental behaviors and perceived self-efficacy. However, this article was not able to more directly test this version of the

extended model that specifies such conditional effects of perceived product values due to the data limitation. That is, splitting the current samples from each country into four segments based on the respondents' environmental attitudes and perceived self-efficacy would have rendered the sizes of some sub-samples too small to conduct proper tests. Therefore, a future study with a larger sample that fit this version of the extended model to each of four green market segments by Ginsberg and Bloom's (2004) framework would be interesting. Such a study would also be meaningful in that, to the best of the author's knowledge, the validity of the normative tenets of Ginsberg and Blooms' (2004) framework itself has not been empirically tested thoroughly yet either, although researchers applied the framework practically (e.g., Zwerg-Villegas 2008) or attempted to improve the framework conceptually (e.g., Chen and Lin 2011).

### **Managerial and Policy Implications**

As this research is based on a single empirical study, one should be cautious to make any generalization or conclusions based on the finding of this study. Nevertheless, the results reported in this article provide some managerial and policy implications for how to facilitate consumers' eco-friendly products adoptions more effectively. Hence, this section discusses some of those implications of the current findings as the propositions to be verified by future research, as opposed to as conclusive recommendations.

First, the findings indicate that the U.S. consumers' intentions to buy eco-friendly products may be improved most by enhancing their general environmental concerns, as well as by strengthening their pro-environmental behaviors, but not by enhancement of their perceived self-efficacy or strengthen perceived social norm. On the other hand, the results also indicate that the Korean respondents' intentions to buy eco-friendly products may be improved most by enhancing perceived social norms about buying eco-friendly products, as well as by improving their perceived self-efficacy and general environmental concerns, but not by enhancement of attitudes towards pro-environmental behaviors. Therefore, the most obvious implication of this study for marketers and policy-makers is that they should focus their activities and policies on improving the more influential factors in their country, or culture, respectively.

On the other hand, the finding that consumers' general concerns for the environment had substantial total effect on their eco-friendly products purchase intentions in both countries implies that enhancing consumers' general environmental concerns can be a fundamental and very efficient way to increase consumers' adoption of eco-friendly products. Therefore, marketers and policy-makers may want to design and implement strategies that aim to enhance consumers' awareness of various environmental issues and their relevance to their everyday lives, thereby improving their concerns for the environment.

Regarding enhancing consumers' perceived self-efficacy, the findings of the empirical study indicated that enhancing consumers' general environmental concerns will also have positive effects on their perceived self-efficacy directly or indirectly through its impact on attitudes towards pro-environmental behaviors. That is, the more environmentally concerned consumers are, they are more likely to educate themselves about environmental issues, thereby enhancing their self-efficacy in behaving in pro-environmental manners. In addition, effective management and implementation of various eco-friendly products certifications schemes may help consumers identify truly eco-friendly products and enhance their perceived self-efficacy as many marketing scholars have advocated (Bottega and De Freitas 2009; Gulbrandsen 2006; Schäfer 1996; Howard and Allen 2006; Thøgersen, Haugaard, and Olesen 2010; Nilsson, Tunçer, and Thidell 2004).

Finally, to the extent that consumers' perceived social norms about buying eco-friendly products affect their intentions to do so and that their perceived social norms is influenced by government policies, policy-makers may want to revise their environmental policies and regulations so that the policies make pro-environmental behaviors deemed normal and desirable from consumers' perspectives and elicit their pro-environmental behaviors voluntarily rather than coercively (e.g., Carson and Roth 2009; Gallagher and Muehlegger 2011; Lavergne et al. 2010).

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