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## **Revista de Cercetare si Interventie Sociala**

ISSN: 1583-3410 (print), ISSN: 1584-5397 (electronic)

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Revista de cercetare și intervenție socială, 2019, vol. 66, pp. 278-297

<https://doi.org/10.33788/rcis.66.16>

Published by:  
Expert Projects Publishing House



On behalf of:  
„Alexandru Ioan Cuza” University,  
Department of Sociology and Social Work  
and  
HoltIS Association

REVISTA DE CERCETARE SI INTERVENTIE SOCIALA  
is indexed by Clarivate Analytics (Web of Science) -  
Social Sciences Citation Index  
(Sociology and Social Work Domains)

# Measuring Green Brand Equity in Relationship Interactions and its Impact on Brand Loyalty

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## Abstract

This manuscript attempts to define the dimensions of green brand equity from the perspective of relationship interactions and explores their impacts on brand loyalty. Through a literature review and questionnaire-based research, this paper employs structural equation modeling to test the proposed model in a case study (green flooring products). The results indicate that interaction-based green brand equity is comprised of five aspects of green brands: image, reciprocity, attachment, trust, and satisfaction. The findings demonstrate that interaction-based green brand equity has a significant influence on brand loyalty. This study strengthens the understanding of interaction-based green brand equity, and also provides a perspective for interactive communication between green brands and consumers.

*Keywords:* interaction relationship, interaction-based green brand equity, green brand, measurement dimension, brand loyalty, social media, social development.

## Introduction

Due to the increasing focus on environmental sustainability, brands worldwide are increasingly turning to conspicuous sustainability as a development strategy, and are attempting to act in more environmentally-friendly, or “green”, ways to gain competitive advantage. However, facing consumer skepticism about the attributes, performance and authenticity of green products, most brands are unable to gain significant returns from their investments in green marketing (Ng *et al.*, 2014). Green brand equity is conducive to exploring consumer attitudes towards green brands, investigating green purchasing behaviors, and verifying green marketing strategies. Therefore, recent research has adopted the perspective of

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green brand equity to gauge consumer-specific attitudes towards green branding initiatives (Chen, 2010; Chen & Chang, 2012; Chen & Chang, 2013; Delafrooz & Goli, 2015). A great deal of concerns have been given by researchers to the exploration of consumer-based green brand equity. Although great importance has been attached to building, maintaining, and managing the relationships between consumers and green brands, few researchers have attempted to examine green brand equity in terms of brand relationships (Fetscherin & Heinrich, 2014). Based on interpersonal relationships theory, this paper attempts to fill this gap to construct measurable dimensions of green brand equity from the perspective of relationship interactions and examines the relationship between interaction-based green brand equity (IBGBE) and brand loyalty.

## **Construct definitions and literature review**

### *The concept of consumer-based green brand equity*

Brand equity has been considered as a symbol of brand success and has become a popular research theme in the field of brand management. Consumer-based brand equity (CBBE) derives from cognitive psychology and focuses on consumers' brand perception and cognition, which has been emphasized in brand equity research. While definitions of CBBE vary, its conceptualization is consistent with brand associations, knowledge, credibility, and loyalty. On the basis of previous research, Christodoulides and Chernatony (2010) proposed a definition of CBBE, as "a set of consumers' perceptions, attitudes, and behaviors generates utility enhancement and makes a brand gain greater returns compared to it without a brand name". Brand equity has been applied to the environmental and sustainable attributes of green brands to satisfy consumers' increasing demands for environmentally-sustainable consumption. Chen (2010) first defined green brand equity as "a set of brand assets and liabilities about green commitments and environmental concerns linked to a brand, its name and symbol that add to or subtract from the value of the product provider." For example, if green brands convey manufacturers' green commitments and concerns in consumers' minds, consumers will tend to pay a premium for green brands. Referring to Christodoulides and Chernatony (2010) and Chen (2010), this paper defines *consumer-based green brand equity* as a set of consumer perceptions, affections, and behaviors towards the environmental commitments and concerns associated with a brand that raises utility improvement and makes the brand to achieve greater value. The concept of consumer-based green brand equity emphasizes the cognition, attitudes and emotions of consumers towards green brands. It provides valuable insights for green marketing and brand building; however, it ignores the relationship between consumers and green brands.

### *The concept of relationship-based green brand equity*

Various researchers seem to share the idea that brands can serve as relationship partners and that, sometimes, consumers are willing to build relationships with brands like they build interpersonal relationships (Aggarwal & Iacobucci 2004). When consumers and brands associate with each other, it is considered a 'brand relationship' or 'consumer-brand relationship' (Smit, Bronner, & Tolboom, 2007). Some scholars have focused on a specific industry to explore the relationship between consumer-brand relationships and brand equity. It has been indicated that the quality of a brand relationship influences brand equity via franchisee brand citizenship behavior (Nyadzayo, Matanda, & Ewing, 2016). Banks have resorted to relationship marketing to afford their customers a pleasant brand experience and avoid consumer loss (Yoganathan, Jebarajakirthy, & Thaichon, 2015). Therefore, brand equity is defined as a relational market-based asset that results from the relationships between a brand and its end-users (Delgado-Ballester, & Munuera-Aleman, 2005).

Establishing and enhancing consumer-brand relationships positively influence brand equity. Consumer-brand relationships reflect the overall nature of relationships between green brands and consumers, and are vital to consumer's decisions to continue or end that relationship, resulting in variable brand-related responses. It is instrumental in nurturing brand equity. Accordingly, consumer-brand relationships provide a new path for investigating green brand equity. Papista and Krystallis (2013) applied consumer value and relationship marketing in green marketing and aimed to provide insights into the development of consumer-green brand relationships. Green brands assist consumers in achieving perceived green value and establishing self-green brand connections, which contributes to brand loyalty (Lin, Lobo, Leckie, 2017a). In other words, green brands provide functional and emotional value to consumers, and consumer-perceived value has been identified as important in building self-green brand connections. Consumer-green brand relationship is a predictor of willingness to repurchase or re-patronize. Hence, creating greater value and benefit for consumers is helpful to consumer-green brand relationships and, in turn, consumers' responses to green brands contribute to the formation of green brand equity. Referring to Delgado-Ballester and Munuera-Aleman (2005) and Chen (2010), *relationship-based green brand equity* can be defined as a relational market-based asset related to the relationship between consumers' environmental concerns and brands' green commitments.

### *The measurement of green brand equity*

Chen (2010) proposed that green brand image, green brand satisfaction, and green brand trust investment exert strong influences on green brand equity. Compared with conventional brands, consumers take a skeptical attitude towards green brands and are suspicious of their green performance. On the basis of

Chen (2010), Ng *et al.* (2014) established a holistic framework of green brand equity, which considers green brands' quality, credibility, image, and perceived value. According to perceived risk theory, Chen and Chang (2013) reported that strengthening green brands' perceived quality and awareness and reducing their perceived risk is conducive to enhancing green brand equity. In view of sustainable development, green brand equity is composed of green brand satisfaction, affect, and trust, and brand loyalty (Kang & Hur, 2012). Considering that some consumers are still suspicious about the authenticity of green brands, Avcilar and Demirgunes (2016) conducted a study of gas station companies and showed that green brand equity consisted of 'greenwashing', green perceived risk, green confusion and green trust. Their integrated measurement model only underlined consumers' perception, knowledge and attitude towards green brands, but ignored green brands' attitude towards consumers.

## **The concept and measurement of dimensions of interaction-based green brand equity**

### *The concept of interaction-based green brand equity*

Conventional consumer-brand bonds have tended to focus on relationship development and maintenance. However, the essential interaction between consumers and brands has not been fully examined. This article attempts to explore green brand equity from the perspective of relationship interaction. Despite positive value being placed on green brands, the act of choosing these brands presents a gap between values and behaviors, even for green consumers (Dutot, 2014). Such a gap may be bridged by effective interaction between brands and consumers. Recently, brand equity has been considered as a relational market-based asset that is built through the interactions between brands and their consumers (Sierra *et al.*, 2015). Interaction activities and communication processes nurture brand relationships, create brand images in the minds of consumers and, consequently, generate brand equity (Wang, Hsu, & Fang, 2009), which can be applied to the green brand equity domain. Consumer-brand interactions are deemed to be similar to interpersonal communications. The development of relationships depends on the implementation of functional exchange and effective communication between two parties, generates variable relationship quality, and brings about various corresponding behaviors. Hence, consumer-green brand interaction provides evidence that the establishment of green brand equity can be understood through interpersonal communication theory.

In essence, green brand equity does not depend on the unilateral perceptions, emotions and behaviors of consumers towards the environmental protections and sustainable commitments related to a brand but, essentially, on bilateral interactions between consumers and green brands (Wickham & Knee 2012). The interaction

between consumers and green brands mirrors the strength of the relationship and its likelihood of continuance. Especially strong interactivity motivates the development of consumer-green brand relationships and contributes to the formation of green brand equity. Accordingly, interaction progress manifests as interaction quality, advances green brand relationship development, and generates green brand equity. Therefore, relationship interactions are a key component of green brand equity. By applying interaction relationships to green marketing, this study proposes a new construct: *interaction-based green brand equity*. It can be described as differential interaction-related effects that depend on the interaction-related perceptions of consumers towards a brand's sustainable practices and environmental concerns, and forms a process of mutual interaction between a green brand and its consumers. *Interaction perceptions* refer to consumers' whole cognition, emotion and attitude towards the interactive contents, processes and results between green brands and consumers, while *differential interaction effects* refer to differences in consumers' evaluations of, and reactions to, green and conventional brands' marketing strategies.

#### *The measurement dimensions of interaction-based green brand equity*

Following interpersonal communication theory, this paper proposes measurement dimensions of green brand equity from the perspective of consumer-green brand interactions. The features of green brand images appeal to consumers so they associate with green brands and establish the basis for the development of a green brand relationship. Functional exchange and emotional communication achieved in the interaction process between green brands and consumers are accompanied by correspondingly different interaction perceptions. *Image features* refer to consumers' overall perception towards a green brand, which is reflected as the green brand image. *Functional exchange* and *emotional communication* in the interaction process refer to consumers' perceptions of the interaction contents and their communication experiences. Functional exchange is reflected as *green brand reciprocity*, while emotional communication is reflected as *green brand attachment*. Differential interaction perceptions contribute to differential interaction evaluations and are reflected as *green brand trust* and *green brand satisfaction*. Differential interaction evaluation has corresponding interaction effects, generates variable cognition, attitudes and behaviors towards green brands, and eventually, results in distinct green brand equity. Thus, a framework for interaction-based green brand equity can be constructed from green brand image, green brand reciprocity, green brand attachment, green brand trust, and green brand satisfaction, as illustrated in *Figure 1*.

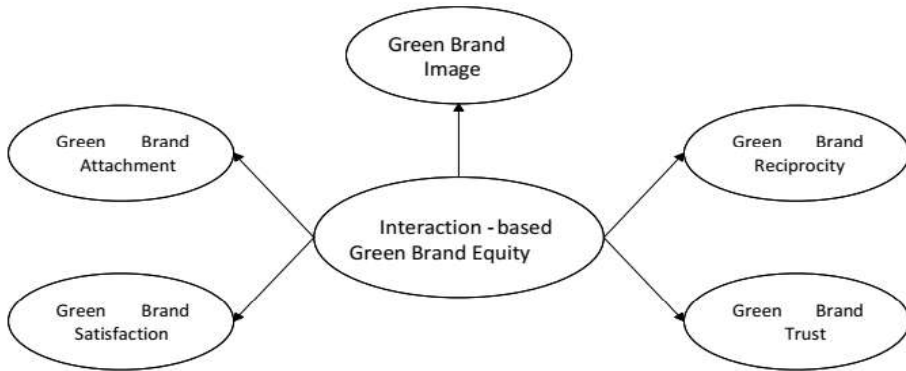


Figure 1: Interaction-based green brand equity measurement model

### *Green brand image*

The image of green brands is valuable, in that it deepens environmental associations, creates brand uniqueness, and strengthens brand impression. It also provides consumers with an outlet for self-expression, self-definition, and self-enhancement (Hartmann & Apaolaza- Ibanez, 2012). Chen (2010) defined *green brand image* as “a group of perceptions of a brand-related environmental promises and obligations. on the part of consumers”. Bekk *et al.* (2016) argued that green brand image consists of brand-related environmental aspects, in turn, adds (or subtracts) brand value, thus, increases (decreases) green brand equity independently from the objective environmental features of economic benefits. Moreover, consumers develop feelings and expectations based on green brand images and integrate their green brand perceptions with their environmental values (Kim & Hall 2015).

For green brands, *image features* refer to the overall environmental aspects of green brand perception. They establish a basis for interaction and lay a foundation for the formation and development of consumer-green brand relationships. Engagement of restaurants in green practices has been found to positively influence their green image, as well as contribute to the formation of brand equity (Young & Jang, 2013). Jeong *et al.* (2014) conducted an investigation in the café setting and found that green image was positively in relation to customer attitudes. Green brand image will determine consumers’ perceptions of environmental performance of the brand, and influence the strength of the green brand relationship resulting from the interaction. Thus, it is reasonable to expect that enhancing the images of green brands can enhance interaction-based green brand equity.

### *Green brand reciprocity*

*Reciprocity* is defined as “an in-kind response to beneficial or harmful acts” (Fehr & Gächter, 2000). So, receivers return favors to those that they perceive to have a reciprocal relationship with (Hahn & Albert, 2017). This has been identified as a critical element in relationship marketing (Hoppner, Griffith, & White, 2015). For the purposes of this study and drawing on Wu, Chan, & Lau (2008), *brand reciprocity* refers to a kind of intrinsic motivation to respond to the acts of a related brand. When consumers perceive strong benefits and that outweigh the costs of interactions with brands, they tend to reward brands and maintain a brand relationship. For example, consumers may be encouraged to try a free product at a supermarket. Feeling indebted, they are likely to purchase more. Consumers actually develop and maintain rewarding relationships with brands that bring functional benefits during interactions.

Hence, brand reciprocity can enhance consumer-brand relationships and increase consumers’ commitment to them. This accords with the idea that reciprocity is considered as one dimension of relationship marketing and has positively influenced brand equity in banks (Yoganathan, Jebarajakirthy, & Thaichon, 2015). *Green brand reciprocity* refers to consumers’ positive responses to perceptions of environmentally-sustainable benefits. Green brand reciprocity embodies privileges and favors perceptions of green brands that result from perceived functional exchanges during interactions and consumer-green brand relationships. Similarly, consumer-green brand relationships that build on beneficial, rewarding and respectable interactions eventually generate green brand equity. Therefore, we argue that green brand reciprocity and resulting green brand cognition are important components of the quality of interactions in green brand equity.

### *Green brand attachment*

*Brand attachment* refers to the strength of a consumer’s relationship with a brand. It influences brand trust, commitment, and satisfaction, and implies satisfying, trusting, and committed relationships (Jillapalli & Wilcox, 2010). A person who has a great attachment to a specific object is inclined to be bonded with it and maintain an interaction with it (Fedorikhin, Park, & Thomson, 2008). Brand attachment generates similar consequences for the beloved objects and has been regarded as one of the two critical drivers of brand equity (Park *et al.*, 2010). Brand attachment represents a particular commitment as an effective foundation of brand loyalty (Grisaffe & Nguyen, 2011). In other words, attachment to a brand signifies that there is a high expectancy or evaluation from its consumers. A brand that considers consumers’ specific preferences and gains their acceptance will obtain higher brand loyalty and brand equity. Following this definition, *green brand attachment* refers to the strength of the effective bond between consumers and green brands that results from their long-term interaction. Consumers feel a



sense of intimacy and attach green values to green brands. This becomes as an effective basis of self-connection and brand equity. It is reasonable to propose that green brand attachment should be an important component of interaction-based green brand equity.

### *Green brand trust*

*Trust* is generally considered to be a set of faiths held by an individual resulting from their perceptions of certain attributes. In the context of marketing, trust refers to “the expectation held by the consumer that products can be rely upon since they are dependable and keep their commitments” (Sirdeshmukh, Singh, Sabol, 2002). Relationship marketing stresses the importance of trust, which is regarded as the core basis for, and indispensable ingredient in strong relationships (Delgado-Ballester & Munuera-Aleman, 2005). Trust can be used to express a brand’s characteristic that inspires confidence in customers (Brudvig, 2014).

Combining relationship quality with trust-based brand equity in the environmental context, Chen (2010) defined “green brand trust as a willingness to rely on a brand based on the faith or expectation residing in its credibleness, kindness, and capacity about its environmental performance.” It has been regarded as the “willingness of consumers to rely upon products which they have confidence in arising from their sustainable performance” (Martinez, 2015). Prior research has verified that green brand trust is a core predictor of green brand equity (Kang & Hur, 2012). Therefore, green brand trust is regarded as a component of interaction-based green brand equity.

### *Green brand satisfaction*

*Satisfaction* refers to the contentment level of post-consumption estimation, or the extent of joyful, hedonic, consumption-related fulfillment (Paulssen & Birk, 2007). It is the degree of delight or pleasure perceived by a consumer in response to product quality or brand experience that meets the consumer’s expectations and demands. Satisfaction generates positive brand attitude, brand loyalty, repeat purchases (Martenson, 2007), and referrals to additional consumers (Nella & Christou, 2014). Satisfaction is generally treated as a significant determinant of consumer-based brand equity (Pappu & Quester, 2006).

*Green satisfaction* has been regarded as “a joyful level of consumption-related fulfillment to satisfy a consumer’s environmental desires, sustainable expectations, and green needs” (Chen, 2010). Green satisfaction is described as a sense of delight resulting from the ability of a product to fulfill consumers’ needs, expectations, and desires in an environmentally-safe, eco-friendly and sustainable manner (Martinez, 2015). Green brand satisfaction has been discovered to exert great influence on the formation of green brand equity (Ng *et al.*, 2013) and, hence, is an important driver of it.

## **Development of a scale of interaction-based green brand equity and its impact on brand loyalty**

### *Flooring products as the green brand*

Flooring products are chosen as the green brand because they belong to the typical durable consumer goods and have a long service cycle. Most consumers only purchase flooring products when they have planned to decorate their new houses or renovate old houses, which makes it difficult for consumers to accumulate green brand awareness and green flooring consumption experience. Thus it is extremely necessary for green flooring brands to establish consumer-green brand relationship and explore the interaction between green brands and consumers.

### *Item generation*

In order to generate items for IBGBE, three approaches were utilized: (1) the literature on interaction relationships and green brands was extensively reviewed; (2) focus group discussions were carried out to assist in generating items for measuring interaction-based brand equity; and (3) in-depth interviews with marketing experts were conducted. Interaction-based green brand equity does not have fit scale that guarantees measurement effectiveness. Literature related to interaction relationships, green brands and green brand equity were reviewed and initial measurement attributes were gained based on this review.

Two structured focus group interviews were undertaken. One group comprised eight young respondents (aged 18–35 years), while the other contained eight participants between 36–55 years. This research refers to the approach of examining a diverse group of respondents proposed by Bose *et al.* (2018) in their research on customer-based place brand equity. The respondents were required to describe their perceptions of green brands and their own experiences related to green brand relationship interactions. Then the respondents were required to consider green floor brands from the relationship interaction perspective and express their opinions about the influences on, and the content and results of, green brand relationship interactions.

Two in-depth discussions were conducted in addition to the focus group interviews. Two PhD candidates with purchasing experience of green floor brands were invited to give suggestions regarding the accuracy and readability of the items. Subsequently, two marketing experts were invited to improve the simplicity and effectiveness of the scale. Eventually, an IGBGE scale was developed. The constructs were measured with multi-item scales. Green brand image, trust, and satisfaction were measured using the scale of Chen (2010). Green brand reciprocity was measured using the scale from Shuai and Zhang (2015). As for green brand attachment, we used a scale based on Park *et al.* (2010).

Table 1: Questionnaire constructs, items, and sources

Construct	Item	Source
Green brand image	The brand sets a great standard of environmental commitment.	Chen (2010)
	The brand is professional in environmental reputation.	
	The brand has well-established environmental and human health concerns.	
	The brand is reliable about environmental promises and product quality.	
Green brand reciprocity	The benefits of this brand significantly outweigh its cost.	Shuai & Zhang (2015)
	This brand provides more privileges than other brands because of its environmental performance.	
	Compared to other brands, this brand is more valuable because it is resource- and life-saving.	
	Consumers and the brand have a win-win relationship because of its green attributes.	
Green brand attachment	My emotional attachment to this brand is high because of its environmental commitments.	Park <i>et al.</i> (2010)
	This brand reminds me of my environmental concerns.	
	I am willing to maintain a relationship with this brand because of its environmental performance.	
	I would feel annoyed when someone laughs at the brand	
Green brand trust	I think that this brand's environmental commitments generally can be rely upon.	Chen (2010)
	I think that this brand's environmental performance generally can be rely upon.	
	I think that this brand's environmental claims generally can be depend on.	
	This brand's environmental obligations meet my expectations.	
	This brand makes consistent promises and commitments to environmental protection.	
Green brand satisfaction	I is a glad decision to choose this brand because of its environmental commitments.	Chen (2010)
	I feel that buying this brand because of its environmental performance is a right thing.	
	Overall, I am happy to purchase this brand because it is environmentally-friendly.	
	Overall, I am satisfied with this brand because of its environmental aspects.	

### *Sampling and main data collection*

A series of environment regulations and laws have been enacted to advance green revolution. Green consumption behavior plays an important role in mitigating environment impact. Accordingly, it's essential to analyze green brand equity in relationship interactions and its impact on brand loyalty. A self-administered questionnaire was conducted to collect data from Chinese consumers of green floor products. The questionnaire contained pictures and descriptions of five Chinese green floor brands: Power Dekor, Nature, Der, KENTIER, Vohringer. All these floor brands were obtained from "Top 100 green brands" officially released by the China Brand Magazine and China Brand Research Center of Peking University. All the items in the questionnaire were measured utilizing a seven-point Likert-type scale. The questionnaire was distributed to volunteers through Wechat software and each volunteer would receive an extra premium after finishing the questionnaire. A total of 700 questionnaires were distributed, and 490 usable responses were received. Some 49% of respondents were male and 51% were female. This study randomly divided the data into two sets; one was used for exploratory factor analysis (245 samples), while the other was used for confirmatory factor analysis (245 samples).

### *Exploratory factor analysis*

This study utilized SPSS 18 software to verify construct validity. The results showed that the Kaiser Meyer Olkin (KMO) statistic was 0.918. Bartlett's test of sphericity indicated the scale was appropriate for factor analysis ( $\chi^2 = 3104.649$ ,  $df = 210$ ,  $p < 0.001$ ). The factors were extracted by principal component analysis and rotated by varimax orthogonal rotation, then the factor loading and the score of common factors were calculated. After deleting five items with factor loadings below 0.6 and cross factor loadings above 0.4, a total of 16 items remained, and five main components were obtained from the factor load matrix (see *Table 2*).

In *Table 2*, Cronbach's  $\alpha$  coefficients of all constructs are over 0.7 and the cumulative percentage of explained variance (%) reaches 69.948%, indicating that the data has acceptable internal consistency and reliability.

Table 2: Exploratory factor analysis

Item	Component					Variance explained (%)	Cronbach's $\alpha$
	GBT	GBI	GBA	GBR	GBS		
GBT1	0.825					21.125	0.908
GBT2	0.824						
GBT3	0.771						
GBT4	0.634						
GBT5	0.614						
GBI1		0.796				13.964	0.846
GBI2		0.783					
GBI3		0.713					
GBI4		0.708					
GBA1			0.815			12.851	0.794
GBA2			0.726				
GBA3			0.700				
GBR1				0.769		12.380	0.756
GBR2				0.720			
GBR3				0.672			
GBS1					0.853	9.282	0.751
GBS2					0.813		

Note: GBT = green brand trust, GBI = green brand image, GBA = green brand attachment, GBR = green brand reciprocity, GBS = green brand satisfaction

*First-order confirmatory factor analysis*

AMOS 21. software was applied to obtain confirmatory factor analysis results, and absolute and comparative fit indexes were employed to evaluate the overall model fit (Table 3).

Table 3: First-order confirmatory factor analysis

Test index	$\chi^2/df$	AGFI	GFI	NFI	IFI	CFI	RMSEA
Value	1.630	0.893	0.928	0.919	0.967	0.966	0.070

As shown in Table 3,  $\chi^2/df$  is less than the critical value of 3.000, GFI,NFI, ,IFI, CFI are all greater than 0.90, and AGFI is nearly 0.900, and RMSEA is below 0.080. The results of the first-order confirmatory factor analysis indicate that the overall fit of the model is very good.

*Reliability and validity analysis*

It was necessary to verify the reliability and validity of the measurements used in this study. As shown in Table 4, the construct reliability (CR) of all five constructs was over 0.7, and two marketing experts were used to improve the measurement, indicating that the measurements used in this study have acceptable reliability. As to validity, the measure of average variance extracted (AVE) was

used to evaluate the discriminant validity of the measurements. In Table 4, the factor loadings of all items are above 0.500 and the AVEs of all five constructs are over 0.500; thus, the convergent validity of this study is acceptable. In Table 4, the square root of each construct's AVE is greater than the correlation between the construct and the other constructs; therefore, the discriminant validity of the measurement is satisfactory. In conclusion, these results indicate that this study's data has great reliability and validity.

Table 4: Item loadings ( $\lambda$ ) and construct CRs and AVEs

Construct	$\lambda$	CR	AVE
Green brand trust			
GBT1	0.640		
GBT2	0.616		
GBT3	0.702	0.844	0.524
GBT4	0.827		
GBT5	0.809		
Green brand image			
GBI1	0.691		
GBI2	0.667	0.841	0.573
GBI3	0.737		
GBI4	0.910		
Green brand attachment			
GBA1	0.748		
GBA2	0.700	0.760	0.514
GBA3	0.701		
Green brand reciprocity			
GBR1	0.588		
GBR2	0.731	0.749	0.502
GBR3	0.791		
Green brand satisfaction			
GBS1	0.753	0.742	0.590
GBS2	0.783		

Table 5: Correlations between the constructs

	GBT	GBI	GBA	GBR	GBS
GBT	<b>0.724</b>				
GBI	0.659	<b>0.757</b>			
GBA	0.701	0.666	<b>0.717</b>		
GBR	0.570	0.552	0.637	<b>0.709</b>	
GBS	0.688	0.589	0.655	0.484	<b>0.768</b>

Note: The data in bold are the square roots of the constructs' AVEs

Second-order confirmatory factor analysis

According to the above theoretical analysis and the correlations of the constructs, it could be speculated that there may be a higher latent factor for all five constructs: IBGBE. Therefore, it was necessary to utilize second-order confirmatory factor analysis. The results are shown in *Table 6*.

Table 6: Second-order confirmatory factor analysis

Path	IBGBE-GBT	IBGBE-GBI	IBGBE-GBA	IBGBE-GBR	IBGBE-GBS
Path coefficient	0.869	0.794	0.871	0.706	0.761
C.R.	10.030	8.285	9.992	7.044	8.928
Test index	$\chi^2/df = 1.558$ , AGFI = 0.894, GFI = 0.929, NFI = 0.922, IFI = 0.971, CFI = 0.970; RMSEA = 0.068				

In *Table 6*,  $\chi^2/df$  is below 3.000, GFI, NFI and CFI are all over 0.90, AGFI is nearly 0.900, and RMSEA is less than 0.080. The C.R.s are all greater than 1.96, which indicates they satisfy a 0.05 significant level. The second fit results show that the five first-order factors have a higher second-order factor: IGBGE. According to the above analysis, the measurement of IGBGE is reasonable and acceptable.

Interaction-based green brand equity and brand loyalty

Green brand equity is strongly associated with brand attitude and positive word-of-mouth communication (Bekk *et al.*, 2016). In other words, consumers who possess high green brand equity have the tendency to respond more positively to green brands and have more favorable attitudes and purchasing intentions. Brand equity exerts effects on brand loyalty (BL) in the context of the fashion industry, and greater interaction is necessary for brands to increase their customers' brand loyalty (Foroudi *et al.*, 2018). In line with prior research, we predict that IGBGE will significantly influence brand loyalty. We therefore hypothesize that:

H<sub>1</sub>: Interaction-based green brand equity significantly affects brand loyalty.

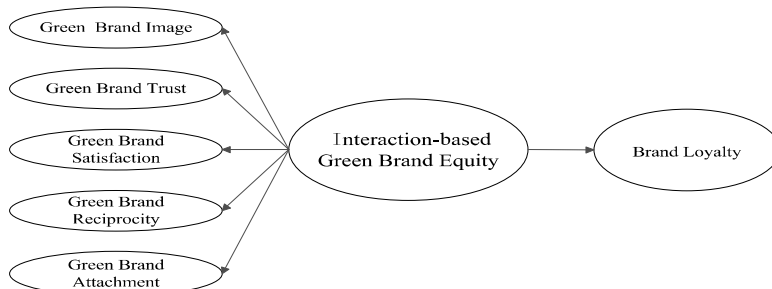


Figure 2: The effect of interaction-based green brand equity on brand loyalty

A study of the Starbucks corporation discovered that a green image contributes to the formation of positive attitudes and, eventually, has an impact on consumer behavior and decision-making (Jeong *et al.*, 2014). In addition, a green brand image has been regarded as a strong antecedent of brand loyalty (Lin, Lobo, Leckie, 2017b). A study on electronic products in South Korea revealed that green brand trust and green brand satisfaction play important roles in building green brand loyalty (Kang & Hur, 2012). Reciprocity has been considered to be one of the critical theoretical components of relationship marketing investment and customer loyalty (Morais, Dorsch, & Backman, 2004). Green brand reciprocity manifests as consumers' tendency to develop reciprocal and mutually-beneficial relationships with green brands. The norm of reciprocity serves as a compensatory mechanism for analyzing retailer-customer interactions (Kaltcheva & Parasuraman, 2009). Under such a compensatory mechanism, when consumers have a perception that they have received something favorable from green brands, they may feel indebted, prompting them to engage in a beneficial green brand relationship and loyal purchasing behavior. Prior studies have demonstrated that consumers who are emotionally attached to a green brand or store have enhanced brand loyalty (Jang, Kim, & Lee, 2015). An experiment conducted in green stores revealed that consumer attachment is a great predictor of store loyalty and product loyalty (Jang, Kim, & Lee, 2015). We thereby hypothesize that:

H<sub>2</sub>: A green brand's image significantly affects brand loyalty.

H<sub>3</sub>: Green brand reciprocity exerts a great impact on brand loyalty.

H<sub>4</sub>: Green brand attachment exerts a great impact on brand loyalty.

H<sub>5</sub>: Green brand satisfaction has a positive influence on brand loyalty.

H<sub>6</sub>: Green brand trust has a positive influence on brand loyalty.

The results of the model (illustrated in *Figure 2*) are now discussed. There was a good model fit ( $\chi^2/df = 1.518$ , GFI = 0.919, AGFI = 0.888, NFI = 0.904, IFI = 0.949, CFI = 0.965; RMSEA = 0.071). The fit of the model was reasonable and the RMSEA is within the acceptable range of 0.05 to 0.08. Moreover, the impact of IBGBE on brand loyalty was significant ( $\beta = 0.867$ ,  $p < 0.001$ ). Therefore, Hypothesis H<sub>1</sub> is supported.

The effects of interaction-based green brand equity dimensions on brand loyalty had good fit ( $\chi^2/df = 1.607$ , GFI = 0.917, AGFI = 0.878, NFI = 0.903, IFI = 0.961, CFI = 0.960; RMSEA = 0.071). The model indices fit well with the observed data and the RMSEA is within the acceptable range of 0.05 to 0.08. Green brand trust positively influenced brand loyalty ( $\beta = 0.277$ ,  $p < 0.05$ ). Green brand reciprocity



had a significant and positive impact on brand loyalty ( $\beta = 0.234, p < 0.05$ ). Green brand satisfaction was found to have a strong positive influence on brand loyalty ( $\beta = 0.252, p < 0.05$ ), green brand attachment positively influenced brand loyalty ( $\beta = 0.417, p < 0.05$ ), while the influence of green brand image on brand loyalty was not insignificant ( $\beta = -0.205, p > 0.05$ ). Therefore, the results supported  $H_3$ ,  $H_4$ ,  $H_5$  and  $H_6$ , but failed to support  $H_2$ . The results of the hypotheses are illustrated in *Table 7*.

Hypothesis	Proposed effect	Path	Path coefficient value	Result
H1	+	IBGBE→BL	0.867***	Supported
H2	+	GBI→BL	-0.205	Rejected
H3	+	GBR→BL	0.234*	Supported
H4	+	GBA→BL	0.417*	Supported
H5	+	GBS→BL	0.252*	Supported
H6	+	GBT→BL	0.277*	Supported

\* $p < 0.05$ , \*\*\* $p < 0.001$

### Managerial Implications

Green branding has been widely adopted to increase financial returns and competitive advantages. However, information asymmetry in green brand communication leads to a lack of knowledge of green brands, skepticism towards their authenticity, and green brand rejection. Thus, it is important to incorporate the idea of relationship interaction into the framework of green brand equity. This study developed measurement dimensions of green brand equity from the perspective of relationship interaction and examined the relationship between interaction-based green brand equity and brand loyalty. This study makes a practical contribution by establishing consumers' loyalty toward green floor brands by focusing on interaction-based green brand equity enhancement.

The findings of this study reveal that interaction-based green brand equity consists of five aspects of green brands: image, attachment, reciprocity, satisfaction, and trust. Hence, investing in resources to increase these aspects is helpful for enhancing interaction-based green brand equity. First, green brand managers should implement authentic green practices to help brands to establish a positive green image. For example, in a floor product setting, natural material selection, green product design, transparent production processes, and disposable packaging, are effective approaches to enhance interaction-based green brand equity. Second, brand managers may adopt strategies that enhance consumers' emotional attachment to green brands. In particular, mining data on consumers' lifestyles, attitudes and pursuits is vital to enhancing the likelihood of self-congruity and consumers' emotional bond with green brands. Third, brand managers need to make consumers clearly identify with green brand values. This can be achieved

by delivering transparent clues of green brands' characteristics to assist consumers in perceiving green brand values and enhancing green reciprocity. In addition, establishing credibility might help green brands to achieve green brand satisfaction and trust. This occurs largely through maintaining green brand commitment and environmental concern. Green brands with consumer satisfaction and trust might leverage their success in gaining interaction-based green brand equity.

The findings show that interaction-based green brand equity has a positive impact on brand loyalty. This finding suggests that managers striving to cultivate and maintain loyal consumers should consider that relationship interactions are important in building consumer loyalty. A combination of social media and mobile devices can be utilized to provide vivid and effective communication with customers (Pelet & Papadopoulou, 2014). Accordingly, enhancing green brand interaction through social media and mobile devices is an underused and feasible approach. Specifically, organizations might allocate resources to green advertising to enhance consumers' perceptions of green brand quality and innovation, and improve their green brand identification. In addition, the green brand community acts as an effective way to promote green brand interaction. It meets consumers' needs for social communication, information sharing and personality expression, and offers active information feedback. Unique brand experiences and sustainable orientation generate great value and brand performance (Hennigs *et al.*, 2017). Therefore, the green brand community can create a pleasant green brand experience and strengthen green brand bonds to further enhance consumers' green brand loyalty.

### *Acknowledgments*

This study was supported by National Natural Science Foundation of China (NSFC) (NO.71772143)

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