

# The Impact of Greenwashing on Brand Reputation, Brand Credibility, and Green Brand Equity: Evidence from the Household Appliances Market

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## Abstract

As customer consciousness of environmental topics increases, green marketing is quickly emerging as a crucial strategy for companies to achieve a competitive advantage. In addition, the rapid expansion of green practices has created concerns among consumers about companies that covertly capitalize on green trends and initiate a discussion about their potential effects on environmental quality. As a result, companies have skillfully used “green” phrases and labeling on any occasion to trick buyers into thinking they are purchasing more environmentally friendly products than they are. Therefore, the question arises: does the practice of greenwashing affect brand reputation, brand credibility, and green brand equity? We assess the proposed model using partial least squares structural equation modeling (Smart PLS software, version 4). Data were collected from 336 customers of green household appliances in Egypt. The results show that greenwashing has a negative effect on green brand equity, brand reputation, and brand credibility. In addition, green brand equity has a positive impact on brand reputation. Brand reputation has a positive influence on brand credibility. Finally, green brand equity has a mediation role in the relationship between greenwashing and brand reputation. The findings have discussed many initiatives intended to lessen the damaging impacts of greenwashing. Additionally, we provide several insightful avenues for the household appliance market.

**Keywords:** greenwashing, brand reputation, brand credibility, green brand equity, household appliances

## 1. Introduction

In recent years, companies have changed their management from brand equity to green brand equity due to the rising customer demand for eco-friendly products and increasing environmental threats (Khandelwal et al., 2019). Consequently, customers are motivated to be more proactive and attentive to green consumption by environmental challenges (Akturan, 2018). Unquestionably, due to its most promising benefits related to the environment, the development of eco-friendly or sustainable products has attracted enormous interest across all academic fields (Akturan, 2018; Javed, 2022). Besides that, due to worsening environmental issues, companies are pursuing the creation and commercialization of green products (de Freitas et al., 2020). For this reason, businesses have skillfully deceived customers into believing they are buying more environmentally friendly products than they are by utilizing “green” words and labeling on any occasion (de Freitas et al., 2020; Dixon, 2020). Greenwashing is the act of overestimating a product or service’s “naturalness” or “eco-friendliness” (Dixon, 2020).

Over the past two decades, there have been a significant number of academic studies related to greenwashing because of the growth of public awareness of greenwashing (Gatti et al., 2019; Javed, 2022). Although earlier studies have significantly added to the body of knowledge on greenwashing, there is still a dearth of empirical studies looking at its effects (Javed, 2022). Thus, this study adds to the body of knowledge related to the greenwashing concept and its impacts on brand reputation, brand credibility, and green brand equity.

In recent years, business research has started looking into the idea of green brand equity, as proposed by Chen (2010). While prior studies have investigated the causes of brand equity in marketing in general (Prados-Peña &

Del Barrio-García, 2021; Preko et al., 2022), there has been relatively little research on green brand equity in marketing (Bekk et al., 2016). Numerous prior studies have acknowledged green practices that support green brand equity (e.g., green satisfaction, green trust, and green brand image) (Chen, 2010; Bekk et al., 2016), green brand image, brand credibility, and green brand perceived value (Ng et al., 2014). Nevertheless, the existing body of knowledge completely ignores many greenwashing that can harm green brand equity (Bekk et al., 2016; Qayyum et al., 2022). Thus, this research adds to the body of knowledge by examining green marketing strategies that harm green brand equity.

Ren et al. (2023) identified brand reputation as the public's perception of a brand's business practices, ethics, and standards. Most previous studies (Herbig & Milewicz, 1993; Erisher et al., 2014; Chaudhuri, 2022) have concentrated on examining the impact of brand reputation on a company's financial success. However, there is not much attention given to studying the effect of brand reputation on brand credibility (Veloutsou & Moutinho, 2009; Molinillo et al., 2022). In this study, we add to the body of knowledge by providing evidence for the importance of brand reputation and its consequences, such as brand credibility, particularly for household appliances.

Kyung et al. (2010) defined brand credibility as the degree to which information recipients consider information to be credible, knowledgeable, and reliable. Ng et al. (2014) recommended two methods for building green brand credibility. Firstly, companies should deal with organizations that promote environmental protection to gain credibility in the green movement. Secondly, start offering eco-friendly products to credible ones. Molinillo et al. (2022) addressed the lack of studies that explore the causes of brand credibility. In line with this, this research contributes to understanding the effect of two antecedents that may influence brand credibility: greenwashing and brand reputation.

Egypt is seen as a potentially attractive market for electronics brands due to its recent stable growth and predicted future expansion. There are two main segments in the electronics market: 1) electronic devices, which include a wide range of products like cameras, tablets, TVs, smartphones, and computers; and 2) household appliances, which involve a wide range of products such as small kitchen equipment, vacuum cleaners, dishwashers, washing machines, and refrigerators (Statista, 2023). In this study, household appliances were selected as a product category because this industry is well known for being one of the primary sources of environmental pollution (Chen & Chang, 2013). As a result, governmental regulations and customer demands for ecologically responsible production put significant pressure on these products (Ng et al., 2014). In this regard, market revenue for household appliances is expected to reach \$8.38 billion in 2023. The market is anticipated to increase by 9.01% annually (CAGR 2023–2028). The largest segment in the electronics market is major appliances, with a market volume of US\$5.41 billion in 2023 (Statista, 2023).

According to the World Air Quality Index (IQAir, 2023), Egypt is placed in the ninth position of the most globally polluted countries. As a result, Egyptian customers are concerned about green claims. Moreover, Khandelwal et al. (2019) acknowledged that most previous studies on green branding topics were performed in developed nations, while few studies on green marketing strategies were conducted in developing countries. In this regard, Egypt is the largest Arab country with a distinct culture and different values and norms from those of Western and Asian countries. This study builds on existing knowledge to offer further investigation into the impact of greenwashing on brand credibility, brand reliability, and green brand equity in a context that has not been empirically investigated yet for household appliance brands in Egypt.

The rest of the research is divided into the following categories: We analyze the literature in Section 2. Section 3 investigates the connection between the variables of the study (greenwashing, brand credibility, brand reputation, and green brand equity). In section 4, research methodology is covered. Section 5 presents the findings of the study. In section 6, conclusions, implications, limitations, and recommendations for future research investigations are presented.

## **2. Literature Review**

### *2.1 Greenwashing*

The concept of “greenwashing” has its roots in “whitewashing,” which refers to concealment, masking, and camouflage (Akturan, 2018). In the mid-1960s, the phenomenon of deceptive environmental communication started to be acknowledged when the environmental movement was officially recognized (Torelli et al., 2020). It was first used in 1986 by environmentalist Jay Westerveld (Watson, 2017). “Greenwashing” refers to inflated, doubtful, and untrue claims (Akturan, 2018).

Furthermore, Nemes et al. (2022) defined greenwashing as exaggerating an organization's environmental efforts

or using more resources to carry out environmentally responsible policies. Dixon (2020) described greenwashing as overestimating a product or service's naturalness or eco-friendliness. Consequently, investors and consumers have serious concerns about environmental issues (Akturan, 2018; Javed, 2022). So, there is an impressive increase in the practice of "greenwashing," in which businesses purposefully highlight the environmental or green aspects of their products (Javed, 2022).

### *2.2 Green Brand Equity*

Since the notion of "brand equity" was first presented in the late 1990s, it has emerged as one of the key marketing issues in both marketing theory and practical implementations (Srinivasan et al., 2005). Brand equity can be defined by depending on two approaches: 1) the firm's perspective, which emphasizes financial value as a measure of a company's performance, and 2) the consumer's perspective, which relies on the interaction between brands and customers (HossienEmari, 2012; Soenyoto, 2015).

Based on Aaker's (1991) definition of brand equity, Chen (2010) 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 provided by a product or service" (p. 310). In addition, Górska-Warsewicz et al. (2021) defined green brand equity as "a collection of brand assets and liabilities on the one hand and as a collection of consumer perceptions, affects, and behaviors about environmental liabilities and green concerns connected to a brand, its name, and its symbol on the other" (p. 3).

The antecedents of green brand equity have received much attention in earlier studies. In this regard, Chen (2010) demonstrated that green brand image, green satisfaction, and green trust serve as causes of green brand equity, which have favourable effects on sustaining green brand equity. Moreover, Ng et al. (2014) found that two main factors contribute to green brand equity: green perceived value and green brand image. In addition, Bekk et al. (2016) concluded that green trust, green satisfaction, and green brand image have favourable effects on green brand equity.

### *2.3 Brand Reputation*

Aaker and Keller (1990) described brand reputation as the perception of quality connected to the brand name. Lau and Lee (1999) showed that brand reputation relates to people's perceptions of a brand's quality and trustworthiness. Additionally, Chaudhuri (2022) defined brand reputation as the total value, esteem, and character of a brand as perceived or assessed by the public. According to Van Riel and Balmer's (1997) view, there are three stages of corporate reputation: the first phase was in the 1950s, when reputation concentrated on the perception of corporate and brand image, while the 1970s and 1980s experienced the second stage with an emphasis on corporate identity and corporate communication. Finally, the third phase concentrates on corporate brand management and reputation in the 1990s (Ren et al., 2023).

Lau and Lee (1999) introduced some recommendations that help companies build their reputations through their brand advertising and public relations, as well as by focusing on their performance and quality. Moreover, Chaudhuri (2022) suggested that a company can build its reputation by achieving brand uniqueness by offering distinctive value to customers. Findings from prior studies show that brand reputation has a positive impact on customers (Lau & Lee, 1999) and companies (Herbig & Milewicz, 1993; Erisher et al., 2014; Chaudhuri, 2022; Cheng et al., 2023). For customers, Lau and Lee (1999) found that brand reputation helps customers make purchasing decisions and boosts their trust. Ahmadi and Ataei (2022) argued that when a company has a good brand reputation, customers will trust the products of the company and feel pleasure and pride when making their purchase decisions. For companies, a good brand reputation positively contributes to the company's financial performance (Herbig & Milewicz, 1993), equity (Erisher et al., 2014), and profits (Chaudhuri, 2022). Cheng et al. (2023) proposed that for companies to have a good brand reputation, they must be socially conscious.

### *2.4 Brand Credibility*

Erdem and Swait (1998) were the first to introduce the concept of brand credibility. Brand credibility is defined as "the reliability of the information delivered by a brand." It also refers to how customers view the brand and the claims made by the products (Erdem & Swait, 2004). Furthermore, Rahim et al. (2016) showed that credibility is a multifaceted concept that pertains to a person's perception of the reality of information. Moreover, they mentioned that expertise and trustworthiness are the most important elements of credibility.

Erdem and Swait (1998) and (2004) mentioned that brand credibility involves two main dimensions: 1) expertise refers to being able to provide information about the company, and 2) trustworthiness refers to the customer's confidence in what is offered. Furthermore, Erdem and Swait (2004) recommended that spreading information

through marketing tactics is crucial for developing brand credibility as it influences customers' selection of a brand. Companies will find it highly challenging to build their brands as credible when customers are doubtful about them (Fitrianingrum & Celsya, 2020).

### 3. Hypotheses Development

#### 3.1 Greenwashing and Green Brand Equity

As customers' awareness of environmental issues grows, green marketing is emerging as a crucial tactic for businesses looking to build a competitive edge. Customers realize greenwashing when the company disseminates incorrect or misleading information about the actual status of the organization's environmental plans, goals, strategies, and actions (Zhang et al., 2018). Chen (2010) confirmed that green brand equity would increase if customers believed in a company's use of green techniques. On the other hand, Chen et al. (2016) claimed that greenwashing would hamper green marketing efforts. Moreover, Qayyum et al. (2022) mentioned that when customers do not trust the company's green claims, it impedes the development of green brand equity. Consequently, greenwashing might negatively impact green brand equity. So, the following hypothesis is presented:

**H1:** *Greenwashing has a negative effect on green brand equity.*

#### 3.2 Greenwashing and Brand Reputation

According to Kalafatis et al. (1999), some corporations offer new products that make inaccurate environmental claims and provide fake ecological functions. As a result, some companies' products are not trustworthy to customers because they advertise new products that make unclear and deceptive green promises and overstate the environmental benefits of their products. Consequently, buyers are less likely to trust these items, which harms the reputation of the companies' brands.

Furthermore, Ioannou et al. (2023) concluded that greenwashing has a detrimental effect on a company's reputation, which diminishes a company's credibility. Xiao et al. (2022) also confirmed that greenwashing decreases brand reputation and harms brand legitimacy. Moreover, Santos et al. (2023) argued that greenwashing harms a company's reputation. Considering the discussions mentioned above, the following hypothesis is presented:

**H2:** *Greenwashing has a negative effect on brand reputation.*

#### 3.3 Greenwashing and Brand Credibility

Depending on Heider's (1958) attribution theory, which argues that an individual's views about the causes of their previous actions influence their future behavior and response, this can be employed to investigate the connection between greenwashing and brand credibility. Based on the attribution theory model, it is acceptable to suppose that when customers receive green information on a product or items, they may interpret it as misleading and intended to highlight the products' fake environmental advantages.

According to Chen and Chang (2013), greenwashing confuses consumers, heightens risk perception, and undermines green trust. Consequently, consumers assign an adverse association to this situation, which has negative consequences such as lowering brand credibility. In this regard, Van Teeseling (2020) and Javed (2022) concluded that reducing greenwashing practices would increase customers' perceptions of brand credibility. In this regard, we suggest that greenwashing will undermine the credibility of brands. Thus, we argue the following hypothesis:

**H3:** *Greenwashing has a negative effect on brand credibility.*

#### 3.4 Green Brand Equity and Brand Reputation

Wang et al. (2021) mentioned that brand equity may affect or be influenced by a company's reputation, depending on the situation. Most previous studies confirmed that brand equity is an antecedent of brand reputation (Sözer et al., 2017; Wang et al., 2021; Ren et al., 2023). Wang et al. (2021) confirmed that brand reputation is a consequence of past actions by the company. Others have verified the opposite relationship (Mahmood & Bashir, 2020; Vuong & Bui, 2023).

Prior research focused on studying the link between brand equity and brand reputation without considering the environmental perspective. To the researchers' knowledge, there has never been a study investigating how green brand equity impacts brand reputation. Previous studies addressed that brand equity has a positive effect on brand reputation. So, customers may acquire good attitudes and feelings for a brand when they have a lot of successful product performance experiences (Ren et al., 2023). Thus, we predict a positive effect in the green

context. Based on the previous discussion, we propose the following hypothesis:

**H4:** *Green brand equity has a positive effect on brand reputation.*

**3.5 Brand Reputation and Brand Credibility**

Herbig and Milewicz (1993) claimed that establishing a company’s reputation is the basis for achieving credibility. Besides that, Veloutsou and Moutinho (2009) argued that brand reputation positively impacts brand credibility through the company’s ability to keep its commitments. As a result, customers have confidence in its reliability and trustworthiness. Additionally, Molinillo et al. (2022) proposed that customers predict that a brand will match their expectations according to the brand’s current reputation. Therefore, we argued the following hypothesis:

**H5:** *Brand reputation has a positive effect on brand credibility.*

**3.6 The Mediation Role of Green Brand Equity**

Customers wouldn’t believe the business’s claims about being environmentally friendly, which would prevent the growth of green brand equity (Chen et al., 2016; Rahim et al., 2016; Qayyum et al., 2022). Furthermore, previous studies (Sözer et al., 2017; Wang et al., 2021; Ren et al., 2023) confirmed that brand equity is an antecedent of brand reputation. Consequently, the researchers argued that green brand equity mediates the relationship between greenwashing and brand reputation. Therefore, we proposed the following hypothesis:

**H6:** *Green brand equity mediates the relationship between greenwashing and brand reputation.*

Based on the above discussion, we proposed the following model (see Figure 1)

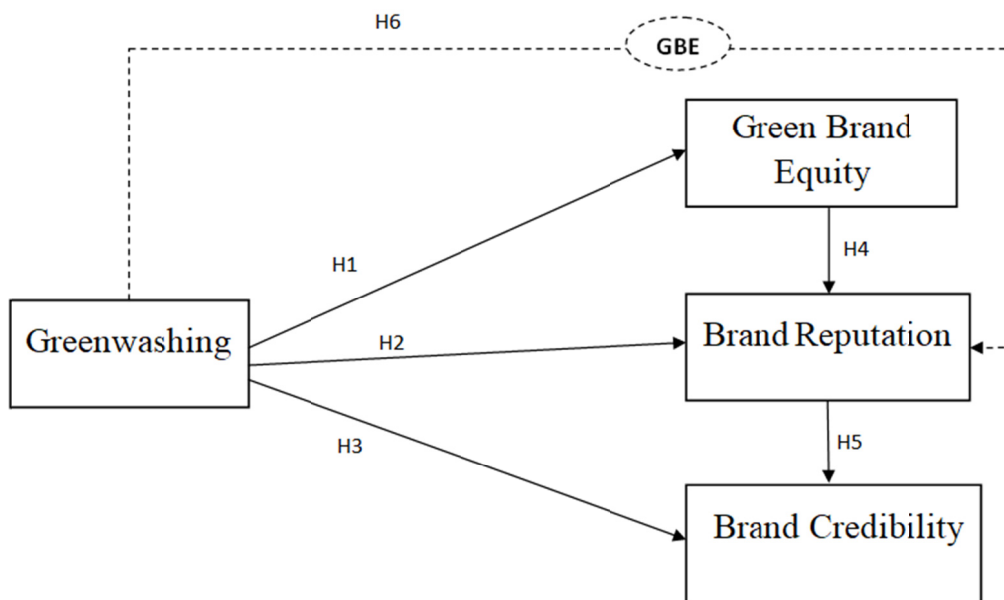


Figure 1. The proposed model of the study’s variables

**4. Methods**

**4.1 Sample and Procedure**

The current study was carried out in Egypt. Egypt is a developing country where many businesses have been discovered actively using green marketing strategies to attract potential customers. Furthermore, Egypt intends to turn 30% of all public projects green by 2024 and then increase that percentage to 100% by 2030. In addition, Egypt invested 447 billion Egyptian pounds in 691 green initiatives across various industries. In September 2020, Egypt was the first to issue green government bonds (Al-Khudair, 2021). In this regard, the Egyptian government has surveyed customers about their intention to buy green household appliance products. The results revealed that 39.6% of them expressed their interest in buying green household appliance products, and most of them were males, urban residents, highly educated, and highly income. In addition, the questionnaire results

showed that 71.2% of Egyptian customers are willing to spend more money on green household appliance products (Cairo, 2023). Therefore, we applied our study to the household appliance market in Egypt.

We applied a quantitative approach based on a cross-sectional research design. We use Cochran's formula for an infinite population to calculate the sample size. According to Godden (2004), the equation is  $SS = [Z^2 p (1 - p)] / C^2$ . The population proportion ( $p$ ) is 0.5, the confidence intervals ( $C$ ) are 0.05, and the confidence level is at 95% ( $z$  value: 1.96). To obtain a 95% confidence level, the real values must be within  $\pm 5\%$  of the surveyed values; hence, 385 surveys are required. The study's participants were selected randomly. They reached during the shopping hours in Cairo's five most famous malls (Cairo Festival City Mall, City Stars Mall, Open-Air Mall Madinaty, Mall of Arabia Cairo, and Katameya Downtown Mall). The researchers selected Cairo as more than 20 shopping malls currently exist in Cairo, and several of them are grouped in congested regions of the city (Oxford Business Group, 2022). According to Saunders et al. (2012) convenience sample is suitable for reaching difficult-to-identify members of the population. In addition, it is quick, affordable, and simple (Etikan, 2016). Consequently, in this study, we employed a convenience sampling approach, as there are too many customers in the target population, so it is impossible to include everyone.

Data was gathered by using a paper-printed questionnaire. The self-administered method is used to distribute and collect the data manually. During June and July 2023, we received 350 surveys. Regarding the objectives of the study, a filter question was added to screen out ineligible individuals because participants needed to have experience with green household appliances. As a result, 336 of the 350 surveys had valid responses, which is acceptable for our research. Table 1 depicts the profile of the sample. The Harman single-factor test was applied. According to the findings, a single factor explained 42% of the total variance (less than 50% within the acceptable range) (Podsakoff et al., 2012). As a result, there is no common method bias. The data was analyzed using SPSS 26.0 and Smart PLS v.4.

Table 1. Sample characteristics

Sample profile (valid n = 336)	Frequency	Percentage %
<b>Gender</b>		
Male	180	53.5
Female	156	46.5
<b>Age (years)</b>		
20–29	106	31.5
30–39	142	42.2
40–49	76	22.7
50 or above	12	3.6
<b>Education</b>		
Undergrads	8	2.4
Bachelor	225	66.9
Master or Phd	103	30.7
<b>Family Income (monthly)</b>		
5000>10000	23	6.9
10000>15000	88	26.2
15000<	225	66.9

Table 1 displays the 336 respondents' demographic profiles. In terms of gender, 180 (53.5%) men and 156 (46.5%) women were present. The sample's participants were between the ages of 20 to 29, 30 to 39, 40 to 49, and 50 or older (31.5%), (42.2%), (22.7%), and (3.6%) respectively. Nearly two-thirds of the sample (66.9%) had at least a bachelor's degree, followed by those with master's or doctorate degrees (30.7%) and those with an undergraduate degree (2.4%). Regarding income, 66.9% of the sample had a monthly income of more than 15,000, followed by (26.2%), whose monthly income was between 10,000 and less than 15,000, and only (6.9%), whose monthly income was between 5000 and less than 10,000.

#### 4.2 Measures

The questionnaire is composed of two main parts. The first part contains the scale items for greenwashing, green brand equity, brand reputation, and brand credibility. We used a 5-point Likert scale, from strongly disagree (1) to strongly agree (5), to evaluate the construct items. The second section includes demographic information, including gender, age, education, and family income.

This study employed a 5-item scale designed by Chen and Chang (2013) to assess greenwashing (GW). For measuring green brand equity (GBE), we used a 4-item scale designed by Chen (2010). To measure brand reputation (BR), we used a 5-item scale developed by Veloutsou and Moutinho (2009). Finally, we relied on a 6-item scale created by Erdem and Swait (1998) to measure brand credibility (BC).

## 5. Results

### 5.1 Measurement Model Evaluation (MME)

The hypotheses were investigated using SmartPLS v. 4 by applying partial least squares structural equation modeling (PLS-SEM), which minimizes the residual variances of dependent variables (Henseler et al., 2009).

Table 2 clarifies the results of measurement model statistics, which shows that the measurement model presents an acceptable outer loading above 0.60 (Chin, 1998). Furthermore, the Cronbach's alphas and composite reliability values for all constructs were above 0.70, far greater than the suggested requirement (Nunnally & Bernstein, 1994).

Table 2. Convergent validity and internal consistency reliability

Construct/Indicators	Loading	Cronbach's $\alpha$	CR	AVE
<b>Greenwashing (GW)</b>		0.923	0.942	0.766
1- This product misleads with words in its environmental features.	0.879			
2- This product misleads with visuals or graphics in its environmental features.	0.899			
3- This product possesses a green claim that is vague or seemingly un-provable.	0.906			
4- This product overstates or exaggerates how its green functionality actually is.	0.880			
5- This product leaves out or masks important information, making the green claim sound better than it is.	0.808			
<b>Green Brand Equity (GBE)</b>		0.911	0.937	0.789
1- It makes sense to buy this brand instead of other brands because of its environmental commitments, even if they are the same.	0.851			
2- Even if another brand has the same environmental features as this brand, you would prefer to buy this brand.	0.878			
3- If there is another brand's environmental performance as good as this brand's, you prefer to buy this brand.	0.921			
4- If the environmental concern of another brand is not different from that of this brand in any way, it seems smarter to purchase this brand.	0.901			
<b>Brand Reputation (BR)</b>		0.870	0.904	0.657
1- This brand is trustworthy.	0.845			
2- This brand is reputable.	0.894			
3- This brand makes honest claims.	0.863			
4- This brand has a long-lasting nature.	0.752			
5- In the past, today and in the future, the values behind this brand will not change.	0.677			
<b>Brand Credibility (BC)</b>		0.915	0.934	0.703
1- This brand has a name you can trust.	0.827			
2- This brand product claims are believable.	0.809			
3- This brand delivers what it promises.	0.835			
4- You just can believe what the ads say about this brand.	0.826			
5- Over time, my experiences with this brand had led me to expect it to keep its promises.	0.905			
6- This brand reminds me of someone who is competent and knows what they are doing.	0.824			

Note. CR= composite reliability; AVE= average variance extracted.

Table 3 also shows that all values in Average Variance Extracted (AVE) were higher than 0.50, supporting convergent validity (Fornell & Larcker, 1981). The AVE for each reflective construct had to be bigger than its correlations with the other constructs, as shown in Table 3, following Fornell and Larcker's (1981) criterion; the discriminant validity was supported.

Table 3. Discriminant Validity assessment (Fornell and Larcker's criterion)

	Brand Credibility	Green Brand Equity	Brand Reputation	Greenwashing
Brand Credibility	<b>0.838</b>			
Green Brand Equity	0.819	<b>0.888</b>		
Brand Reputation	0.620	0.614	<b>0.810</b>	
Greenwashing	-0.524	-0.458	-0.542	<b>0.875</b>

Note. The diagonal elements are the square roots of AVE. The simple bivariate correlations between the constructs are represented by other elements.

### 5.2 Structural Model Evaluation

According to Hair et al. (2011), the structural model evaluation involves four basic steps: Multicollinearity should be calculated, followed by calculating the  $R^2$  values for the coefficient of determination, the significance of the path coefficients, and the  $Q^2$  values for the predictive relevance.

To make sure there is no multicollinearity issue, we first employed the variance inflation factor (VIF). According to Hair et al. (2011), the permissible range for VIF values is less than 5, as all the values ranged between 1.998 and 4.579. Second, we assessed the model's predictive ability; we calculated the coefficient of determination ( $R^2$  value). The  $R^2$  values for the five endogenous variables of green brand equity ( $R^2 = 0.207$ ), brand reputation ( $R^2 = 0.697$ ), and brand credibility ( $R^2 = 0.696$ ) were all better than 10%, the model has an improved capacity for prediction (Falk & Miller, 1992). As a result, the structural model's  $R^2$  score was a good predictor. Third, we use the bootstrapping method to evaluate the significance of path coefficients at a significance level of 5% and 5000 subsamples (Chin, 1998; Hair et al., 2012). Finally, we evaluated the predictive validity of the structural model using  $Q^2$  in addition to  $R^2$ . Green brand equity, brand reputation, and brand credibility all have  $Q^2$  values that are more than zero, demonstrating that exogenous constructs can predict the endogenous construct.

We calculated the square root mean residual value, which we found to be 0.072, with the criteria that the accepted value should be less than 0.08 (Hu & Bentler, 1999), indicating that the model had a good fit. We also used the Wetzels et al. (2009) equation to determine the goodness-of-fit (GoF) value. The findings indicated that the GoF value was 0.623, more than the cut-off value of 0.36. Thus, the model is a good fit.

### 5.3 Testing of Hypotheses

Table 4 displays the evaluation of the hypotheses using the path coefficients and p-values. The results showed that greenwashing affects green brand equity negatively and significantly ( $\beta = -0.458$ ,  $P < 0.05$ ), supporting H1. Furthermore, greenwashing impacts brand reputation negatively and significantly ( $\beta = -0.215$ ,  $P < 0.05$ ), so H2 is accepted. Moreover, greenwashing influences brand credibility negatively and significantly ( $\beta = -0.104$ ,  $P < 0.05$ ), supporting H3. Additionally, green brand equity impacts brand reputation positively and significantly ( $\beta = 0.715$ ,  $P < 0.05$ ), supporting H4. Moreover, brand reputation has a positive and significant influence on brand credibility ( $\beta = 0.774$ ,  $P < 0.05$ ), so H5 is supported (see Table 4). Our findings address the fact that green brand equity partially mediates the effect of greenwashing on brand reputation. Thus, H6 ( $\beta = -0.328$ ,  $P < 0.05$ ) is supported.

Table 4. Hypotheses testing results of direct and indirect effects

	PC	SE	95% CIB	t-value	p-value	Support
Direct effects						
H1 GW → GBE	-0.458	0.055	(-0.557 -0.347)	8.286	0.000	Yes
H2 GW → BR	-0.215	0.041	(-0.212 -0.130)	5.282	0.000	Yes
H3 GW → BC	-0.104	0.040	(-0.182 -0.026)	2.612	0.009	Yes
H4 GBE → BR	0.715	0.030	(0.659 0.776)	24.323	0.000	Yes
H5 BR → BC	0.774	0.032	(0.707 0.834)	23.772	0.000	Yes
Indirect effect						
H6 GW → GBE → BR	-0.328	0.036	(-0.395 -0.254)	9.062	0.000	Yes

Note. PC means path coefficient; SE means standard error; CIB means confidence interval bias; GW= Greenwashing; GBE= Green Brand Equity; BR= Brand Reputation; BC= Brand Credibility.



## 6. Conclusion, Implications, and Limitations

### 6.1 Conclusion

Our results showed that greenwashing has an adverse effect on green brand equity. These findings support Chen et al. (2016) and Rahim et al. (2016), who argued that greenwashing practices would hamper green marketing efforts primarily because they would increase skepticism around green claims. Additionally, Qayyum et al. (2022) acknowledged that customers wouldn't believe the company's claims about being green, which hinders the growth of green brand equity. Thus, we argue that companies of household appliances should reduce their greenwashing practices to improve green brand equity. Second, this study addressed the fact that greenwashing has a detrimental impact on brand reputation. This result is in line with Xiao et al. (2022); Ioannou et al. (2023); Santos et al. (2023), who confirmed that greenwashing decreases brand reputation. Third, the current research found that greenwashing harms brand credibility. Our results are consistent with the arguments presented by Chen and Chang (2013); Van Teeseling (2020); Javed (2022) that greenwashing has negative consequences for brand credibility.

Fourth, we found that green brand equity is an effective way to improve brand reputation. The current study depended on the results of Sözer et al. (2017); Wang et al. (2021); Ren et al. (2023), who argued that brand equity is an antecedent of brand reputation. The findings of this research confirmed that when we consider the environmental perspective, we concluded that green brand equity positively impacts brand reputation. This result is compatible with Ren et al. (2023), who mentioned when a product performs well constantly, customers form favourable opinions and sentiments about the brand. Fifth, this research confirmed that brand reputation has a positive impact on brand credibility. This result agreed with Herbig and Milewicz (1993); Veloutsou and Moutinho (2009); Molinillo et al. (2022), who proposed that brand reputation is an antecedent of brand credibility. Finally, this study concluded that green brand equity partially mediates the relationship between greenwashing and brand reputation. This result is compatible with the results of Chen et al. (2016); Rahim et al. (2016); Qayyum et al. (2022), which showed that greenwashing harms green brand equity. In addition, this study revealed that if companies tend to enhance their brand reputation, they should improve their green brand equity practices. This result agreed with Sözer et al. (2017); Wang et al. (2021); Ren et al. (2023), who confirmed that brand equity is an antecedent of brand reputation. Therefore, this study reveals that all the study's hypotheses are supported.

### 6.2 Theoretical Implications

This research provides new ideas for the existing studies of greenwashing, brand reputation, brand credibility, and green brand equity. First, this research improves the academic understanding of green marketing strategies. Although prior research has substantially increased our awareness of greenwashing, few empirical studies examine its consequences (Javed, 2022). Thus, this research expands our understanding of the greenwashing concept and how it affects brand reputation, brand credibility, and green brand equity.

Second, this study investigated the detrimental impacts of green marketing tactics on green brand equity. In this regard, this study broadens our understanding of the damaging practices of greenwashing on green brand equity. It may be because most previous studies have emphasized exploring the impact of positive green practices, e.g., green brand image, green trust, green satisfaction, and green brand perceived value on green brand equity (Chen, 2010; Ng et al., 2014; Bekk et al., 2016; Qayyum et al., 2022). So, this study provides new avenues for further investigation and increases the knowledge about the negative consequences of using green marketing tactics.

Third, greenwashing harms brand reputation. This research is a response to Javed's (2022) calls for further empirical research on exploring the consequences of greenwashing (e.g., brand reputation). Fourth, greenwashing harms brand credibility. This result confirmed that brand credibility is essential for differentiating the market offering and encouraging customer confidence in the company's promises (Qayyum et al., 2022). Indeed, our results confirm the significance of brand credibility, especially when dealing with doubting customers. In addition, this study supports the critical role of brand credibility in the literature of green marketing, as greenwashing misleads customers, increases risk aversion, and erodes consumer confidence in the environment. Thus, customers will be skeptical (Chen & Chang, 2013; Akturan, 2018). Moreover, this research contributes to the body of knowledge on brand credibility by following the recommendations of Molinillo et al. (2022) to conduct further studies on the antecedents of brand credibility. In this context, we study greenwashing and brand reputation as antecedents of brand credibility.

Fifth, this study addressed that green brand equity positively impacts brand reputation. According to the researchers' knowledge, this study adds to the green marketing literature, as no other study considers the environmental perspective in this relationship. Prior studies acknowledged that brand equity is an antecedent of

brand reputation (Sözer et al., 2017; Wang et al., 2021; Ren et al., 2023) without taking into consideration the green marketing perspective.

Lastly, this study expands the body of existing knowledge by providing additional insight into the impact of greenwashing on brand reputation through the mediation of green brand equity in a context that has not yet been empirically examined (e.g., the household appliances market in Egypt).

### *6.3 Practical Implications*

This study presents beneficial ramifications for the household appliances market in Egypt. First, our research found that greenwashing negatively influences green brand equity. Chen (2010); Pechyiam and Jaroenwanit (2014) argued that brand equity helps companies achieve high profits, provides companies with a higher competitive advantage, facilitates simple entry into international markets (Pechyiam & Jaroenwanit, 2014), helps companies build strong brands (Chen, 2010), and achieves sustainable business performance (Bhat et al., 2014). Consequently, companies have integrated green marketing practices within the brand equity framework. Therefore, companies should avoid greenwashing tactics to benefit from green marketing initiatives. So, companies should focus on positive strategies that encourage green brand equity, such as green satisfaction, green trust, and green brand image (Chen, 2010; Bekk et al., 2016), brand credibility, green brand perceived value, and green brand image (Ng et al., 2014), to reap the benefits of green brand equity and avoid greenwashing practices.

Second, our research revealed that greenwashing harms brand reputation and credibility. Santos et al. (2023) proposed that a brand's reputation may suffer if it engages in greenwashing or exaggerates a product's sustainability features with deceptive information. In addition, customer trust and credibility can be damaged by greenwashing. So, companies should apply positive green practices that improve brand reputation and credibility. In this regard, companies should disclose trusted information to their customers. Consequently, companies should shift their interest from traditional consumerism to green consumerism. Therefore, companies should apply green consumerism by introducing eco-friendly products that match customers' needs and wants, as well as avoiding marketing myopia.

Third, our study concluded that green brand equity has a positive effect on brand reputation. Marketers could improve green brand equity in household appliance markets by focusing on enriching the household appliance market reputation. It is achieved by shifting to a green perspective by introducing green products that match green customers' expectations and concentrating on providing the correct information at the right time to the right customers. So, highly reputed brands encourage customers' trust in the company's environmental claims, and customers become more loyal to the green brands. Consequently, customers would prefer to purchase these highly reputed green products.

Fourth, our research showed that brand reputation has a positive effect on brand credibility. According to Herbig and Milewicz (1993), a company's reputation is the foundation of brand credibility. Therefore, marketers should post correct information about their environmental performance to their targeted customers; as a result, it would enhance the company's ability to keep its promises. Additionally, Veloutsou and Moutinho (2009) asserted that brand reputation enhances brand credibility by enabling the business to fulfill its commitments; as a result, customers believe that the company is trustworthy and dependable. In this regard, brand credibility is crucial to building the trust of customers because it can be difficult for them to differentiate between green brands and the expanding number of brands that engage in greenwashing. One of the key factors influencing how customers perceive brands is brand credibility; hence, marketers should raise brand credibility. As a result, marketers ought to invest resources and allocate funds to build brand credibility.

Fifth, our study found that brand credibility has a positive impact on green brand equity. Companies can build green brand equity by introducing the right and trusted information to their targeted customers. To maximize the benefits of brand equity in household appliance brands, companies should first identify the market segment that has strengthened green consumerism. Then, they should target this segment using green marketing tools such as energy-efficient, recyclable packaging, better pollution control eco-labels, eco-advertisements, and eco-brands.

Additionally, the government should encourage companies to shift their interest into green consumerism by 1) companies implementing a specific incentive system to promote the use of eco-friendly products such as tax exemption for five years, decreasing the set-up costs, and encouraging holding trade shows, 2) government should implement rules that will encourage businesses to use green marketing practices such as minimize the rules related to licensing, set-up, and taxes.

#### 6.4 Limitations and Future Studies

This study has limitations that ought to be examined in future studies. First, we collected the data from Egyptian customers, so the study's conclusion cannot be applied beyond the Egyptian setting, but future studies can be conducted in other countries. Second, this study focuses only on the household appliance brands. Therefore, future studies may examine other sectors (e.g., cars, hotels, and restaurants). Third, this study used a random sample to get its results. Therefore, future studies should collect data on a larger scale. Fourth, this study used a questionnaire survey to test the hypotheses by depending only on cross-sectional data, making it impossible to see how brand reputation, brand credibility, and green brand equity changed over time as environmental regulations changed continuously. So, future studies should conduct longitudinal studies. Finally, future studies can examine the effect of greenwashing on green brand perceived value, green customer citizenship behaviors, green satisfaction, green brand image, and green trust.

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