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Article

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MARKETING | RESEARCH ARTICLE

The factors affecting the green brand equity of electronic products: Green marketing

Narges Delafrooz^{1*} and Armin Goli¹

Abstract: This study is intentionally functional, and, from the data collection aspect, is a descriptive survey. The statistical data for the present study includes low-power electronic and electric products in Guilan Province. A total of 384 consumers were chosen using the random cluster sampling method. We have used confirmatory factor analysis and structural equation modeling to analyze the given data. The findings show that there is a significant relationship among brand-perceived quality, green brand image, (GBI) and brand value, but not with the green brand-perceived value (GBPV). In addition, the results of the study show that brand credibility has a significant relationship with the GBPV and GBI, but not with the GBPV and GBI, each of which are associated with the green brand in a different way. At the end of this survey, you will read about the intermediate variables, all of which are acceptable, except the intermediate variables of brand credibility and GBI.

Subjects: Business; Management and Accounting; Consumer Behaviour; Marketing Management; Social Sciences

Keywords: brand equity; brand perceived value; brand credibility; brand image; perceived quality and green marketing

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Armin Goli received BA degree in business management from the University Azad of Tonekabon, Iran, in 2012, and master's degree in business management (marketing) in Rasht Azad University, and now he is a PhD student in the field of business management (marketing) in the Islamic Azad University Geshm International Branch. His current research interests include consumer behavior, management marketing, and green marketing.

PUBLIC INTEREST STATEMENT

Due to the increasing intensification of the natural global warming crisis, more and more people are turning their focus to the conservation of nature and the environment. Business organizations need to participate in green marketing and business owners must develop an environmental conscience through the process of product design, manufacturing, packaging, and advertising until the products being the hands of consumers in response to continuously increasing and expanding green consumerism. In addition, the consumers are willing to pay higher prices to buy environmentally friendly products. Electrical products are one of the main causes of environmental pollution and have a serious impact. Thus, there are strict rules, regulations, or laws to control them to protect the environment worldwide. Currently, consumers are demanding green products that save energy and are environmentally friendly. Therefore, the researcher studying the factors that affect the green brand equity of electronic products in the North of Iran.

1. Introduction

Today, industrial products have caused significant environmental contamination worldwide, and hence, have attracted increased attention by society (Chang & Chen, 2013). For this reason, we have considered electronic and electric production as a category that has a major influence on environmental pollution; also, these products are facing immense pressure from legal regulations and public demand for environmentally friendly production (Ng, Butt, Khong, & Ong, 2013). In addition, some industries have applied measures and taken the steps required to reduce environmental pollution. These measures include green marketing or environmentally friendly, which means improving marketing actions environmentally and naturally, and through the utilization of the social/environmental role of the companies to achieve continuous progress (Ranai Kordshuli & Yari Buzejani, 2011).

Green Marketing is the marketing of products that are presumed to be environmentally safe. Thus, green marketing incorporates a broad range of activities, including product modification, changes to the production process, packaging changes, as well as modifying advertising. Five reasons to develop corporate green marketing: reduce pressure on the environment, competitive advantage, improve the image of the organization, explore opportunities to gain new markets, and increase the value of the product. Companies understand that if they supply products and services that satisfy their customers' environmental concerns, then those customers are more likely to favor their products or services. The task for companies in this new environmental era is to identify opportunities to augment their products' environmental credentials in order to strengthen their brand equity (Chen, 2010). Indeed, the widespread environmental consciousness among consumers nowadays means that companies are forced to pay more attention to their environmental management practices. In addition, the increasing popularity of eco-friendly products has engendered intense competition in the eco-friendly industry and its markets, with various brands now producing eco-friendly goods and companies specifically launching green brands to attract customers. However, the intense nature of competition in the eco-friendly market means that companies can no longer simply focus on the eco-friendly functional attributes to secure customer loyalty. Consequently, eco-friendly companies are focusing on branding and brand management to differentiate their products or services effectively. In the sustainable literature field, green marketing applies to functions, policies, and marketing mixes that concern the natural environment, making income and gathering results, which leads to fulfilling the individual and organizational goals in terms of a product or product line (Constantinos, Constantine, & Neil, 2012).

In recent years, with the increased criticisms and measures taken by environmental groups, people have become more knowledgeable and concerned about the surrounding environment, exhaustible resources, and how to use them properly according to the needs of future generations (Manrai, Manrai, Lascu, & Ryans, 1997). These consumers' concerns, as a reaction to the environment, together with environmental regulations have exerted pressure on companies to act in an eco-friendly manner. Hence, companies must significantly reduce the negative effects on the environment in manufacturing, distribution, and supplying raw materials in order to be able to continue their business legally (Ranai Kordshuli & Yari Buzejani, 2011). According to the findings of Ottman (1992), if the company wants to successfully apply green marketing, the environmental concepts and ideas need to be consistent and versatile in all aspects of marketing. In this context, the development of the current concept of marketing and brand building in the green framework seems necessary.

If companies are able to provide products and services that meet their customers' environmental demands, customers will be more interested in their goods and services. In this new environmental era, companies should seek opportunities to improve the environmental performance of their products to strengthen their brand equity (Hadizadeh Moghadam, Jamali Kapak, & Musavi, 2012). For example, green brands, green labels and advertising the environment by providing information about green products and environmental features create positive feelings in target groups and consumers by knowing that a product is green. Accordingly, they will feel better when using them because natural and proper labeling for products with brands creates a positive image, makes

businesses successful, and consumers are willing to buy these products, thereby increasing the brand loyalty (Elahi & Yaghubi, 2012).

With the growing importance of green marketing and corporate trends, particularly their key role for the success of companies, several studies have been undertaken to explain the relationship between the green variables; however, further studies pertaining to this subject are necessary. The overall aim of this study was to examine the relationships between brand concepts (perceived brand quality and brand credibility) and the concepts of green brand (green brand image (GBI), green brand-perceived value (GBPv), and green brand equity (GBE)).

2. Literature review

2.1. Green marketing

Green marketing is a new phenomenon in the field of marketing and business, which has been widely expanded in recent years (Chang & Chen, 2013). In 1976, the Marketing Association of America defined green marketing as the positive and negative aspects of marketing on pollution, and the reduction of energy and other resources (Hamdi, Ghafari, & Afsardegan, 2011). Unfortunately, most people believe that green marketing refers solely to the promotion or advertising of products with environmental characteristics. Terms such as phosphate-free, recyclable, and compatible with the ozone are what most consumers associate with green marketing. However, they are just some signs of green marketing (Elahi & Yaghubi, 2012) in general, green marketing is a much broader issue that can contain the consumer goods, technology, or services in the country (Hadizadeh Moghadam et al., 2012). Green marketing also includes all marketing activities that stimulate and confirm the attitude and environmental practices of customers (Chen, 2010).

2.2. Green brand equity

Among the most important concepts in business activities is brand equity and the measurement thereof, and remains a vital and challenging issue for managers and academic researchers. The overall concept of brand equity from the perspective of Farquhar (1989) is rooted in brand equity as the parameter to determine its value through brand extension or through a brand as a product or service. Brand equity is a relational structure that can only be evaluated when compared with competing brands (Ng et al., 2013). Aaker (1996) suggests that brand equity is an asset term, symbol, logo, or brand on it; according to which the value created by a brand, product, or service company increases or decreases in the mind of the customer. Chen (2010) defines GBE as “a whole range of impressions, conceptions and apprehensions towards a brand in the customers’ memory which is correlated to the sustainability and eco-friendly concerns.” It is plausible that when a firm proclaims to deliver environmentally friendly products, the existing quality perceptions in consumer mind may positively influence to enhance a greener brand image (Aaker & Jacobson, 2001). The main advantage of creating GBE is the definite increase in environmental awareness, which companies can exploit for competitive advantage through the deployment of their products in different markets (Ailawadi & Keller, 2004).

2.3. Brand perceived quality

Today, customers expect better quality more than before, and, hence, quality is a powerful competitive weapon. Perceived quality is an interesting subject to practitioners and researchers, since it has a beneficial impact on the view of marketing performance. Perceived quality provides value to customers through buying and distinguishing the brand from other competing brands (Chang & Chen, 2013), as consumers often judge the overall value of a product or service in accordance with the intended objectives that have been defined. It can also be used as a general assessment of the product’s desirability or superiority (Karbasi Far, Taheri Kia, & Bandpi, 2011). Zeithaml (1988) declares that perceived quality is the perception of a customer concerning the quality of goods or services compared to those of the competitors, which does not include the technical dimension. In

addition, he indicated that perceived quality is a component of brand equity; hence, the perceived high quality leads consumers to choose a particular brand over its rival brands (Ebrahimi, Kheyri, & Yadegariniaraki, 2009).

2.4. Brand credibility

Brand credibility is the most important feature of a brand inasmuch as it could be a sign of product positioning (Amiri Aghdaie, Rezaei Dolatabadi, & Shokri Aliabadi, 2012). Erdem and Swait (1998) state that brand reputation is the central pillar around which a company can create and manage their brand equity (Spry, Pappu, & Cornwell, 2011). In addition, Erdem and Swait (2004) define brand value as constantly believing in the product location information embedded in a benefit depending on the customer's perception of the brand. They take into account two main components: reliability and expertise. Reliability refers to the tendency of companies to deliver what they have promised, while expertise refers to the ability of firms to specialize in what they have promised. In the context of brand reputation, companies that offer environmentally friendly products can ensure that the available credit has a positive impact on dealing with the pessimism of green customers (Ng et al., 2013). In addition, customers consider a brand with a strong reputation to be safe because a strong reputation leads to reduced uncertainty and risk in the purchase, and the consumption of a product (Elliott & Yannopoulou, 2007).

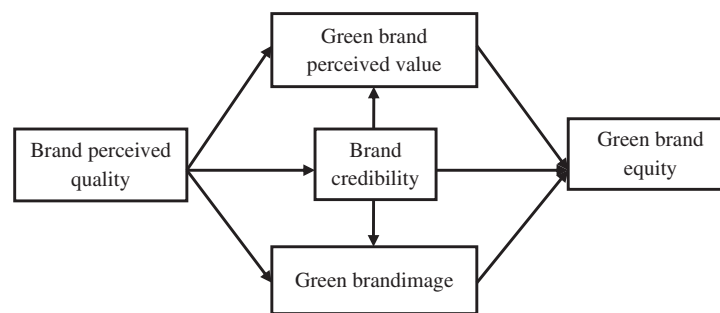
2.5. Green brand image

In his book, *Mysteries of Advertising*, David Ogilvy claims that, in 1953, the concept of brand image was introduced for public opinion. He also states that the concept of Claude Hopkins was first raised in 1933 (Rezayi Dolatabadi, Jushiar Najaf Abadi, KhazaiPul, & VerijKazemi, 2013). Professor Kevin Keller, a prominent scientist and theorist in the field of brand management, believes that brand image is the consumers' perceptions about the brand (Karbasi Far et al., 2011). According to Kotler (1991), brand image is the spirit of the product or service, which is usually passed on to consumers, thus causing them to believe in a certain level of production and helping them to make a purchase decision. Boo, Busser, and Baloglu (2009) believe that brand mental image have the same perception of emotional and accurate image of customers of an especial brand. They believe that brand mental image is an important source of brand equity (Gilani Nia & Mosavian, 2010). According to the definitions provided for brand image, Chen (2010) states that GBI is a whole range of perceptions, concepts and get their customers to the brand in memory associated with sustainability and environmental concerns (Ng et al., 2013). GBI is very important for companies, especially in terms of consumer environmental awareness and the strict conditions of international environmental protection. Companies can use the concept of green marketing and incorporate it in their products to benefit through product differentiation (Chen, Lai, & Wen, 2006).

2.6. Green brand perceived value

The concept of perceived value in recent years has been the focus of many studies (Bolton & Drew, 1991; Holbrook, 1994; Parasuraman & Grewal, 2000; Sweeney, Soutar, & Johnson, 1999). In fact, the brand perceived value is based on the hypothesis of brand equity and refers to the purchase validation, fairness, and appropriation of clients. Hence, customers always pay the costs for products and compare them with the benefits of their brand products (Bolton & Drew, 1991). Based on the concept of Patterson and Spreng (1997), and Chen and Chang (2012), green brand is an overall assessment of the perceived value of a product or service by the customer, and the net profit between what is perceived and what customers are offered based on environmental concerns, expectations, and needs of a sustainable green product (Ng et al., 2013). According to studies, nowadays, consumers believe that the use of environmentally friendly products offers many advantages compared to the conventional products (Hartmann & Apaolaza-Ibanez, 2012); therefore, the needs of the customers for green products or services could be developed while the perceived value of the desired brand/green product increases (Chen & Chang, 2012).

Figure 1. Conceptual model of research.



3. Conceptual model

The hypothesized relationship between the structures of the conceptual model are shown in Figure 1, the investigations model being proposed by Ng et al. (2013) following:

Hypotheses:

- Hypothesis 1: the perceived quality is positively related to GBI
- Hypothesis 2: the perceived quality is positively associated with the perceived green brand value
- Hypothesis 3: the perceived quality is positively associated with brand credibility
- Hypothesis 4: brand credibility is positively associated with the perceived green brand value
- Hypothesis 5: brand credibility is positively related to GBI
- Hypothesis 6: brand credibility is positively related to GBE
- Hypothesis 7: the perceived value of green brand is positively related to GBE
- Hypothesis 8: GBI is positively related to GBE
- Hypothesis 9: brand credibility plays a mediating role in the relationship between the perceived quality and perceived green brand value
- Hypothesis 10: brand credibility plays a mediating role in the relationship between perceived quality and GBI
- Hypothesis 11: perceived green brand value is the mediator in the relationship between brand credibility and GBE
- Hypothesis 12: the mediating role in the relationship between GBI and brand credibility, GBE

4. Research method

The statistical data of the present study includes low-power electronic and electric products in the Guilan Province. The purpose of electronic (refrigerator, clothes and dishwashing machine, microwave, TV, etc.) and electrical products (fans, razors, juicer, chipped and broken heaters, irons, etc.).

In this research, a cluster sampling method was used. First, a request was made for an electoral subdivision map that identifies and labels each city block to the Department of Statistics, Guilan Province, which is located in the North of Iran. From these maps, a list was created of all city blocks. This list served as the sampling frame. Every household in that city belongs to a city block, and each city block represents a cluster of households. The researcher randomly picked a number of city blocks. Using the simple random sample approach, a list of all the households in the selected city blocks was created; these households (the number of households is 669,693) make up the survey sample.

The ever-increasing need for a representative statistical sample in empirical research has created the demand for an effective method of determining sample size. To address the existing gap for easy reference, Krejcie and Morgan (1970) developed a table for determining the sample size for a given

Table 1. Cronbach's alpha values for the variables

Variable	Number of questions	Cronbach's alpha
Brand-perceived quality	4	0.838
Brand credibility	6	0.794
Green brand image	4	0.785
Perceived green brand value	4	0.756
Green brand equity	4	0.812

population. Thus, according to the table of Krejcie and Morgan, for more than 500,000 customers, sample a sufficient number to generate a 95% confidence that predicted the proportion who would be repeat customers within plus or minus 5%, it would need responses from a (random) sample of 384 of all the customers.

For data collection, a questionnaire (standard) is used. The questionnaire is divided into three sections. The first part contains demographic questions, the second part prioritized brands in four categories (choosing three brands based on their priorities in one of the classes of interest), and the third part comprises the main questions (22 questions) with a 5-point Likert scale (strongly agree to totally disagree) to classify the responses. To evaluate the validity of the questions, statements by experts from the Faculty of Business and the Environment about the content of the questionnaire were used, and Cronbach's alpha coefficient was used to assess reliability; should be greater than 0.7 to be accepted. The Cronbach's alpha index for all variables is included in Table 1. Finally, to analyze the data for structural equation modeling (SEM), LISREL software is used.

As is clear from the data in Table 1, the Cronbach's alpha coefficients were calculated, and, in all cases, a value greater than 7.0 was obtained, which shows the high validity of the inventory.

5. Results

5.1. Description of the sample demographic characteristics

The demographic data of the studied samples (384) using SPSS 20 software showed that 52.1% of the participants were male and 47.9% were female. For marital status, 39.3% were single and 60.7% were married. For the educational level, 3.6% of the respondents had under diplomas, 15.1% had diplomas, 19.5% had associate degrees, 40.4% were undergraduates, and 21.4% had masters degrees and higher. With respect to age, 34.9% of the participants were aged under 30, 44.5% were 31–40 years, 15.9% were 41–50 years, and 4.7% were aged over 50 years. In relation to revenue, 34.9% of the respondents earned under one million USD, 51.3% earned between 1 and 2 million USD, 4.9% earned between 2 and 3 million USD, 2.9% earned between 3 and 4 million USD, and 1.6% earned more than 4 million USD. Concerning the elective classes (parts of), the results showed that 38.8% of respondents chose class kitchen and home appliances, 28.6% Audio and Video class, 17.7% types of computers and office machines, and 14.8% for heating and cooling (Table 2).

5.2. Testing the conceptual model

In this part of the analysis, data from SEM are used. In addition, the conceptual model of the research using various methods fit is measured using LISREL 8.54 software, as shown in Figures 2 and 3.

Based on the final model, it is clearly obvious that except for the relationship between all variables in the initial study were positive and significant.

6. Model's goodness-of-fitness

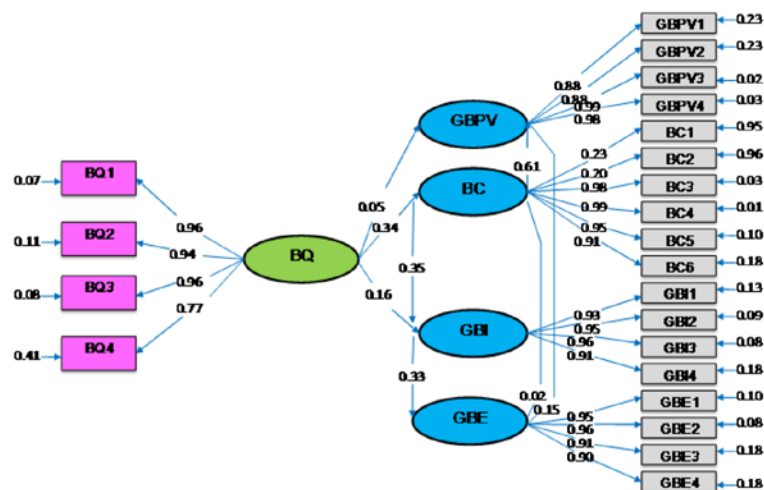
The main hypothesis for the structural model has been applied to a number of plot indices. The following table shows the most important parameters to be fitted. The table below shows the conceptual model of research to explain and fit the appropriate situation (Table 3).

Table 2. Sample demographic characteristics

Variables		Frequency	Frequency percentage
Sex	Male	200	52.1
	Female	184	47.9
Marital status	Single	151	39.3
	Married	233	60.7
Education	Under diploma	14	3.6
	Diploma	58	15.1
	Degree	75	19.5
	Undergraduate	155	40.4
	Masters and higher	82	21.4
Age	Those aged under 30 years	134	34.9
	31–40 years	171	44.5
	41–50 years	61	15.9
	Over 50 years	18	4.7
Revenue	Under one million dollars	134	34.9
	Between 1 and 2 million USD	197	51.3
	Between 2 and 3 million USD	36	9.4
	Between 3 and 4 million USD	11	2.9
	More than 4 million USD	6	1.6
Elective classes	Kitchen and home appliances	149	38.8
	Audio and video	110	28.6
	Types of computers and office machines	68	17.7
	Heating and cooling	57	14.8

Figure 2. The standard estimated coefficients, structural model of research.

Notes: BQ: brand quality, BC: brand credibility, GBI: green brand image, GBPV: green brand perceived value, GBE: green brand equity.



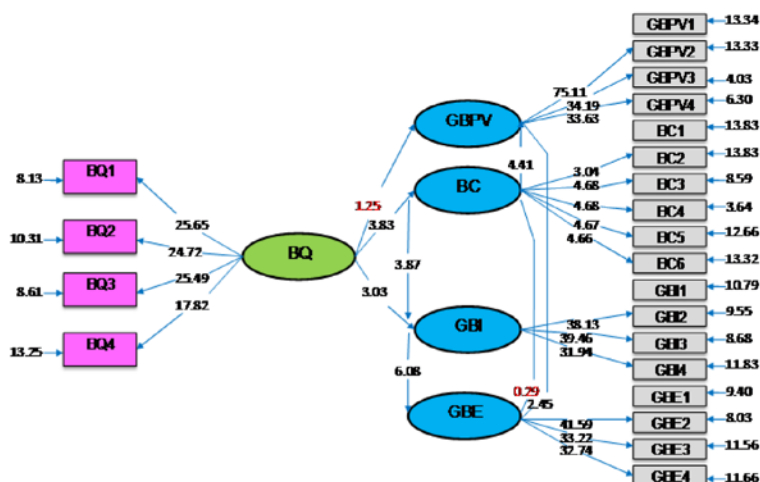
Chi-Square = 531.92, df = 201, P-Value = 0.00000, RMSEA = 0.065

7. Testing the hypotheses

To analyze the data, SEM was used. The test data and hypotheses are shown in Table 4.

Figure 3. Significant numbers of structural models of research.

Notes: BQ: brand quality, BC: brand credibility, GBI: green brand image, GBPV: green brand perceived value, GBE: green brand equity.



Chi-Square = 531.92, df = 201, P-Value = 0.00000, RMSEA = 0.065

Table 3. Fitting parameters of the structural model

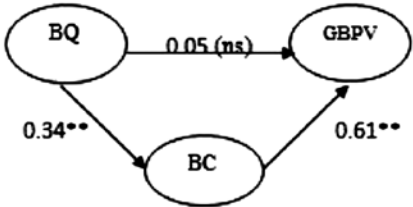
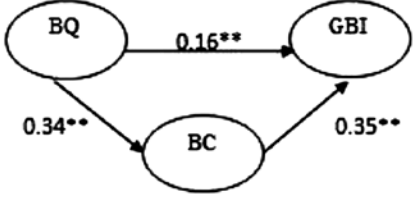
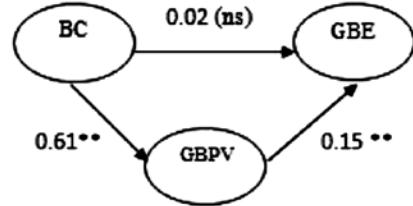
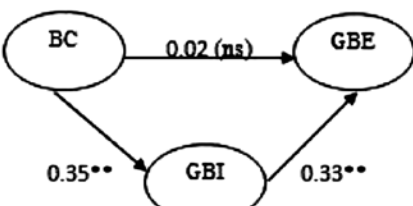
The fit indices	Desired value	Result
χ^2/df	<3.00	2.64
GFI	>0.90	0.92
RMSEA	<0.08	0.06
RMR	>0.05	0.04
NFI	<0.90	0.94
IFI	<0.90	0.95
CFI	<0.90	0.95

For the direct effect between the variables, if the value of t between the two variables is greater than 1.96, it indicates that the relationship between the two variables is significant at the 95% confidence level; otherwise, the relationship is not significant.

Table 4. Results of the evaluation of the structural model

Hypothesis	Path		t-Value	The path coefficient (β)	Results
	Of variables	To variables			
First, second, and third	Brand-perceived quality	Green brand perceived value	1.25	0.05	Rejected
		Brand credibility	3.83	0.34	Confirmed
		Green brand image	3.03	0.16	Confirmed
Fourth, fifth, and sixth	Brand credibility	Green brand-perceived value	4.41	0.61	Confirmed
		Green brand image	3.87	0.35	Confirmed
		Green brand equity	0.29	0.02	Rejected
Seventh	Green brand-perceived value	Green brand equity	2.45	0.15	Confirmed
Eight	Green brand image		6.08	0.33	Confirmed

Figure 4. Results of mediation tests.

Hypothesis	Mediation paths	Mediation results
<p>Ninth:</p> <p>$BQ \rightarrow BC \rightarrow GBPV$</p>		Full mediation
<p>Tenth:</p> <p>$BQ \rightarrow BC \rightarrow GBI$</p>		Partial mediation
<p>Eleventh:</p> <p>$BC \rightarrow GBPV \rightarrow GBE$</p>		Full mediation
<p>Twelfth:</p> <p>$BC \rightarrow GBI \rightarrow GBE$</p>		Full mediation

ns = no -significance ; ** = significance level of $\alpha = 0.05$

The path coefficient between the variables shows the extent of the impact. In this context, Table 4 shows that except for the second hypothesis (the relationship between perceived quality and perceived brand green value) and the sixth hypothesis (the relationship between brand credibility and brand equity green), the rest of the hypotheses were confirmed (Figure 4).

Based on the model in Figure 1, four mediations were tested and the bootstrap total effects of two-tailed significance results are depicted in Figure 2. Based on the results, GBI and GBPV (GBI and GBPV) fully mediate the relationship between brand credibility and GBE. Credibility is found to partially mediate the associations between perceived brand quality and GBI. Finally, credibility is found to fully mediate the association between perceived brand quality and GBPV. In this context, all the intermediate variables, except the variable mediating role of brand credibility on the relationship between perceived quality and brand image brand green have been accepted.

8. Discussion and conclusion

In this research, nine out of the twelve theories posited were accepted, while the other three hypotheses were rejected. Concerning the first and third hypothesis, the results showed a significant relationship among perceived quality, brand image, and reputation of green brand. As a result, the perceived quality of brand is one of the important factors that affect the consumers' preference for

one brand over another, which is considered to enhance its good reputation and positive image of emergence, mutual trust, and promise of increased integrity. However, with regard to the second hypothesis, the results of this study show no significant relationship between the perceived quality and perceived value of green brand; hence, it is clear that the findings of Ng et al. (2013) are consistent with these results.

The fourth and fifth hypotheses show that by increasing brand credibility among consumers, GBI and GBPV increase. This result is consistent with the findings of Chen and Chang (2012) in the context of a positive relationship between the perceived value of brand credibility and GBI. However, for the sixth hypothesis, the research was unable to find a significant relationship between brand credibility and brand equity. However, for brand credibility and GBE, intermediate variables, such as perceived value and GBI (the eleventh and twelfth hypothesis), brand reputation can be a significant indirect influence on GBE. In addition, the studies of Ng et al. (2013) confirm the above statements. The results for hypotheses seven and eight are consonant with the findings of Chen (2010) and Ng et al. (2013) because they have shown that GBPV and GBI have a significant impact on GBE.

Hypothesis nine shows that brand credibility has a mediated and appropriate role of the indirect influence in perceived quality and GBPV. In this context, the findings of Ng et al. (2013) are similar; while the findings of Ng et al. (2013) show that the partial effect of the indirect effect of perceived quality on GBI is the reputation of the brand. It should be stated that the results of research in this field depend on the characteristics of the study population, and, perhaps, could provide similar or different results for other study populations.

9. Implications

This study presents the following practical suggestions based on the findings of this research:

We suggest that companies and marketers improve the quality of their brand, such as performance and better service, brand reliability and the validity of their efforts, as well as increase brand credibility among consumers and create a positive green image of the brand in their minds.

We recommend that attempts be made to increase the rate of credibility of the brand through building trust and reliability based on the promises made; then the GBPV and brand image will be greener in the minds of customers. It is important to remember that consumers are more likely to understand and believe that brands are associated with environmental liability and are consonant with the environmental protection.

For companies that are looking for green marketing strategies, it is recommended that they integrate green brand mental impression and environmentally friendly products for upgrading strategy and marketing communications; therefore, it can create a successful green image in the minds of consumers. Since eco-friendly electronic products are usually priced at a premium in comparison to the conventional electrical products, it is extremely important for the companies to ensure that along with green attributes, the functional performance of their brands are at least equal if not better than the conventional electrical products in the same category to generate substantial GBE. Viewed from another perspective, when the conventional product attributes of a green product are at par with competing brands, the environmental friendly attributes will act to serve as the source of additional value that could generate consumer preference towards such brands. Therefore, we suggest an increase in GBE to boost the perceived value of the brand, such as environmental advantages, functions, and green brand functions, which will lead to loyalty and frequency of green consumers with the brand they are buying.

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