Investigating the Impact of Green Brand Equity on Brand Loyalty: The Mediating Roles of Green brand attachment, Green Trust, Green brand attitude, and Green brand image

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Abstract:

Due to growing awareness towards the issues of environment and consumers need for friendly goods with environment, firms are changing their management to green brand equity. The majority of the prior researches on green marketing, green brand initiative and social economy have been applied in developed economies. Thus, this study tries to cover the gap to assess the green branding equity in the developing country like Egypt. This study examines green brand equity and its influence on Brand loyalty. In addition, to examine the mediating role of GBAT, Green Trust, GBA, and GBI on the relationship between GBE and brand loyalty. With 430 participants who purchased electronic appliances as a sample, a cluster random sampling technique was used to conduct a quantitative study utilizing a questionnaire-based survey. (PLS-SEM) was the method used to analyze the data. the study finding indicated that factors influencing green brand equity of electronic goods are as follows: green brand image, green brand trust, and green brand loyalty.

Keywords: Green brand equity (GBE), Green Trust, Green brand attachment (GBAT), Green brand image (GBI), and brand loyalty

1. Introduction:

As consumers are becoming more aware of the issues of environment and consumers demand for friendly products with environment, firms are changing their management from to green brand equity, firms must amend their branding equity to exploit green brand equity (GBE) (Singh, P., et al., 2019). Consequently, GBE is a new trend paying attention among practitioners and scholars. In addition, scholars concluded that GBE can completely influence customers in many ways, for instance, positive mouth word (Bekk et al., 2019), brand intention and attitude to purchase (Gorska-Warsewicz et al., 2021).The prior literature review indicated that empirical researches are inadequate in the green brand field (Papista and Dimitriadis., 2019).

Nowadays, gradually more businesses all over the world are now concentrating their exertions on sustainable environment and utilizing green branding marketing (Chang et. al., 2014). Thus, key terms like "eco-friendly," "sustainable," "green," and "environmentally friendly," are becoming noticeable in advertisement messages. Furthermore, Green claims ought to be, credible, and transparent. However, many environmental statements are misleading, ambiguous and only concern to the general green features. Consumers are currently transmitting environmental messages over their buying habits. Companies are being compelled to alter the marketing strategies because of the impact of "green buying."

While prior researches have stressed the related problems about branding equity, none of their problems has been investigated from the perspectives of brand image, trusting in environmental problems in a combined manner (Chen. et. al., 2017). Green brand equity is encouraging to exploring customer attitudes to green brands, examining green buying behaviors, and confirming green marketing strategy. Consequently, recent paper has used the green brand equity to measure customer-specific attitudes to green brand initiatives (Chen. et. al., 2010) A great deal of concerns has been given by authors to the examination of customer-based green brand equity.

While great status has been attached to managing, maintaining, and building the relationships between customers and green brand, few authors have trying to test green brand equity in terms of brand relationships (Fetscherin & Heinrich, 2014).

Based on, interpersonal relationship theory, The objective of this research is:

- To investigate the influence of Green brand equity on Green brand attachment.
- To investigate the influence of Green brand equity on Green Trust.
- To investigate the influence of Green brand equity on Green brand attitude.
- To investigate the influence of Green brand equity on Green brand image.
- To investigate the influence of Green brand attachment on Brand Loyalty.
- To investigate the influence of Green Trust on Brand Loyalty.
- To investigate the influence of Green brand attitude on Brand Loyalty.
- To investigate the influence of Green brand image on Brand Loyalty.

2. Literature Review:

Today, a lot of information is obtainable online (Qayyum. et. al., 2023) enabling customers from developing nations to learn about green brand marketing (Khare, A., & Kautish, P., 2022). All the marketing programs, including communication about green products (e.g. advertising, public relations, and publicity), distribution and production of ecologic goods, branding, and eco-labeling, are mutually referred to as green brand marketing performs (Nguyen-Viet, B., 2023). Green marketing performs encourage a green self-perception and favorable customers responses (Lin, M. S., & Chung, Y. K., 2019). Recent study, for instance, defined green trust, green attitude, green loyalty, and green brand image as green performs that support GBE and customers intentions (Tiwari, P., & Pal, S., 2024). Conversely, some green marketing performs, such as green confusion (Khan. et. al., 2022) green washing and (Gorska-Warsewicz. et. al., 2021), have detrimental effects.

This work depends on theory of corporate legitimacy and theory of signaling to test the effect of green brand image, greenwash, green trust,

and green satisfaction on green branding equity. The greenwash phenomenon was related to the corporate legitimacy literature (Seele, P., & Schultz, M. D., 2022). Green brand equity: The brand equity can be identified as the additional value that a brand improves to the product (Deniz, A., & Onder, L., 2017). Branding equity, the immaterial brand property, that is the hidden intrinsic value in a recognizable brand name (Chen, Y. S., 2010). In literature, the definitions regarding brand equity were recommended from three altered viewpoints.

These are finance-based, consumer-based, and definitions are combining both. Finance that is based on brand equity is associated with the income that will bring to the company in the future because of investing into brand (Kang, S., & Hur, W. M., 2012). Consumer that is based on brand equity is identified as the sum of functional and symbolic benefits that customers get as a result of using and brand consumption (Deniz, A., & Onder, L. ,2017). brand equity can be defined as the different influence on the responses that customers make about the marketing of a brand, which can differ in line with information about the brand. This influence is determined by linking the reactions that customers show concerning the well-known brands' marketing activities with the reaction they show against the unknown brand's activities to market products (Chen., 2010).

2.1 Green brand equity and green brand attitude:

Brand equity Kang, S., & Hur, W. M. (2012) emphasized importance of brand concept that leads to competitive advantage. Aaker (1996) created a system for measuring brand equity, which called as "The Brand Equity Ten", and it would be concerned across products and markets to support company's capability. This research identified branding equity as the customers' perceived value to differentiate the specific brand in marketing campaign apart from others.

Attitudes are defined as a person's internal enduring evaluation of an object, issue, person, brand, product, or actionAttitudes are often considered relatively stable and are an enduring tendency of consumers to behave in a specific way (Sallam. et.al, 2012). Hence, attitudes are useful predictors of consumers' behaviors towards a product or brand. Attitudes toward a brand refer to an inclination to respond in a favorable or unfavorable manner to a particular brand.

Chen et al. (2017) defines 'green brand attitude' as consumers' attitude toward their overall evaluation of a brand's green performance. In the context of environmentalism, the strength of brand attitude depends on the consumer's evaluation of the brand's strengths and weaknesses, and the level of positive evaluation of the brand.

Aaker (1996) proposes that brand equity is a vital term, logo, brand, or symbol on it; based on which value produced by a product, brand, or Service firm rises or reduces in the consumers' perception. Chen (2010) describes GBE as "A wide range of perspectives", apprehensions, and perceptions towards a brand in the consumers' memorial which is associated with the eco-friendly concerns and sustainability." It is reasonable that when a company declares to bring friendly products with environment, the current perceptions of quality in customers mind may positively has effect to support a green brand image (Aaker, 2009). The major advantage of establishing GBE is the certain increase awareness in the environment, which firms can take advantage of competitive advantage via the allocation of their goods in many markets (Ailawadi K.L. and Keller K.L).

Recent literature (Hooley GI. et. al., 2005) defines branding equity as association possessions depending on the market because this association is shaped outside the company and in the connections between brands and consumers. As stated by Ailawadi K.L. and Keller K.L. (2004), GBE is defined as a grouping of corporate obligations and resources linked to environmental issues and green issues that are connected to brand and can raise or lower the value of a good or service. The GBE indicates to customer and attitudes behavior concerned to a brand (Mohd Yasin. et. al., 2007) and a significant role in minimizing the risk of novel product (Kalafatis. et. al., 2012).

Green brand equity (GBE) A construct of a dominant brand is a crucial mission for all business (Kang, S., & Hur, W. M., 2012). Having strong BE offers financial and nonfinancial values to the firm such as supporting competitiveness and generating potentials for the brand (Kang, S., & Hur, W. M., 2012). Moreover, it links between marketing activities in the future and past events. It is constructed on former marketing activities, which in turn formulae a benchmark for managing future activities (Ailawadi K.L. and Keller K.L., 2004). Furthermore, BE gives decision-makers insightful information on consumer

preferences and interests (Mohd Yasin. et. al., 2007). This body of study has caused a number of various meanings of BE. In the case of BE, it is being planned by number of scholars that it may be described as the brand creates value added (Chen, 2010). Another school emphasized that BE is the variation between the total value of the tangible assets and the total value of brand (Yoo B, Donthu N., 2001). The works majority may be distributed into three kinds of core paths: those that are firmly financial (Sullivan & Simon, 1993), those that are rarely consumer in nature (Yoo B, Donthu N., 2001), and those are a combination of the two (Motameni, R., & Shahrokhi, M., 1998).

2.2 Green brand attachment:

The term "green brand attachment" describes how strongly a customer feels about a brand. It impacts brand commitment, trust, and suggests trusting, and loyal associations (Jillapalli., 2010). An individual has an excessive attachment to a definite thing is tending to be attached with it and keep a collaboration with it. Brand attachment creates similar concerns for the beloved things and is one of the two vital brand equity drivers. Brand attachment exemplifies a specific commitment as an actual basis of brand loyalty (Grisaffe. et. al., 2011). From another side, brand attachment indicates that there is a high evaluation or expectancy from its customers. A brand that studies customers' definite favorites and increases their reception will get brand equity and greater brand loyalty. This develops as an actual basis of brand equity and self-connection. It is rational to suggest that attachment of green brand must be a significant factor of green brand equity from interaction-based.

2.3 Green brand image:

Chen (2010) characterizes green brand image as "a collection of a brand perceptions in a customer's mind that is connected to both environmental concerns and environmental commitments." A green brand image is significant for companies since it rises green awareness (Alamsyah. et. al., 2020), has a positive influence on preference of green brand and is positively connected to green brand loyalty (Lin. et. al., 2017). More significantly, a green brand image is directly related to green buying behavior (Chen. et. al., 2017) and generates green competitive advantages (Zameer. et. al., 2022). The green brand image similarly involves three kinds of benefits: functional, experimental, and

representative, which Lin et al. (2017) call "green profits." Zameer et al. (2020), from another side, categorize these benefits into if they are psychological or tangible. These researchers adopt that both benefits are similarly significant. Along with Lin et al. (2017), the maximum impacts for positioning of brand result from reasonable blends of the two categories (Lin. et. al., 2017).

The green brands image is valued, in that it extends associations of environment, generates brand exclusivity, and reinforces impression of brand. It furthermore provides customers with an opening for self-definition, self-expression, and self-improvement (Hartmann. et. al., 2013). Chen (2010) identified green brands image as "A lot of perceptions of an environmental brand of obligations and promises. From the part of customers". Bekk & Khandelwal, U. (2019) claimed that green brand image contains environmental brand aspects, in turn, (subtracts or adds) brand value, therefore, rises (reduces) green brand equity individually from the goal of economic aids from environmental aspects. Furthermore, customers develop expectations and feelings depending on green brand images and combine their environmental values with their green brand perceptions (Kim, H. S., & Hall, M. L., 2015).

2.4 Green brand trust:

Trust is considered an important factor in generating a relationship in interactive marketing literature. Trust is a degree of confidence related what others will perform in line with what is anticipated from them and it's one of the significant issues that pays attention in literature of marketing. Since, trust is assessed as a tactical in marketing activity and it's a vital factor in the relationship's success. Brand trust effects the decision of buying. Whole trust in a brand state to the consumers that it is likely for the brand to increase positive value. Examining brand trust as an anticipation is related to the customer belief the brand is responsible, reliable, and honest. Considering the firms that offer green trust, green product can be selected as a willingness to rely on a service or product based on the expectation or belief causing from its ability, credibility, and kindness about performance of the environment (Chen, 2014). Some firms may miss the trust of consumer since they offer misunderstood or confusing green possibilities and overstate the

environmental products value. Hence, trust is a significant element also for green products (Kalafatis. et. al., 1999).

2.5 Green brand loyalty:

Aaker (1996) emphasized brand loyalty is the essential feature of brand equity. Furthermore, a price superior is related with the brand. Chaudhuri, A., & Holbrook, M. B. (2001) Consumer repurchasing is influenced by a brand's behavioral, or purchasing, loyalty, in contrast to brand loyalty attitude involves a level of behavioral commitment based on a distinctive value associated with the brand. Furthermore, the customer has a high level of trust in the brands, which influences both buy loyalty and attitude, resulting in a larger market share and higher pricing in the market. This study identified green brand loyalty as customers' intention to stick with a brand when it comes to green goods in marketing campaigns, which prompts them to choose a certain green product above others and to keep buying it.

3. Research Model:

The hypothesized relationship between the conceptual model's structures are shown in Figure 1:

H1: Green brand equity has a positive influence on Green brand attachment.

H2: Green brand equity has a positive influence on Green Trust.

H3: Green brand equity has a positive influence on Green brand attitude.

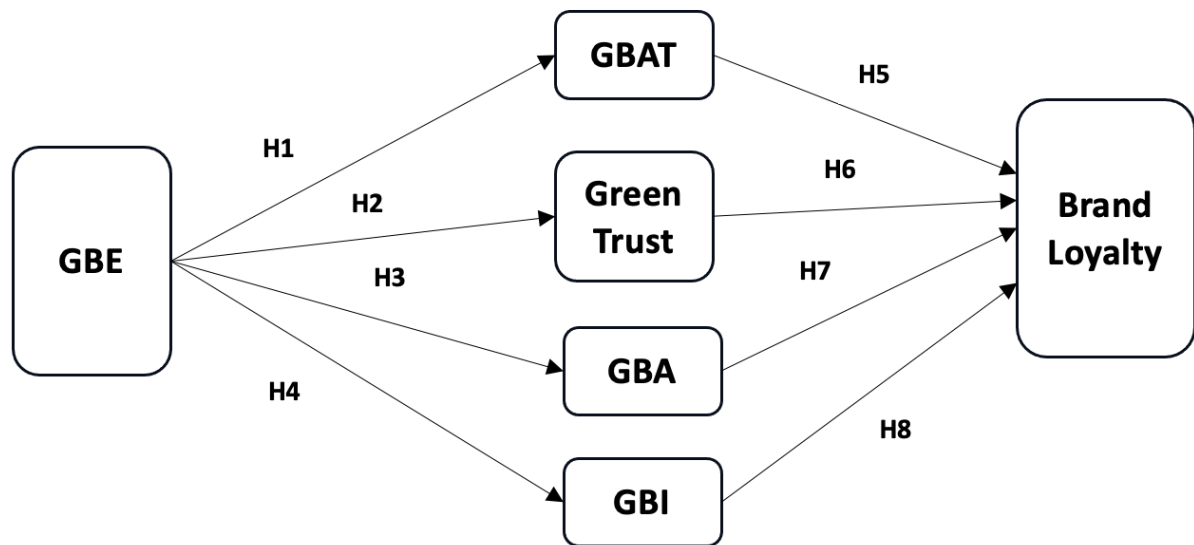H4: Green brand equity has a positive influence on Green brand image.

H5: Green brand attachment has a positive influence on Brand Loyalty.

H6: Green Trust has a positive influence on Brand Loyalty.

H7: Green brand attitude has a positive influence on Brand Loyalty.

H8: Green brand image has a positive influence on Brand Loyalty.

Figure 1: Research Model

4. Research Methodology:

4.1 Population and sampling process:

This manuscript conducts the survey approach which utilizes a questionnaire to test the hypotheses. The applicants are from Cairo City. They are customers who have experiences in buying electrical goods and home appliances in general, they have emissions of greenhouse gases among home appliances, thus the goods design and manufacturing thus have to pursue severe regulations and international laws to reduce the environmental influences (Chen, 2010). Green customers actively getting naturally friendly goods (Lanfranchi. et. al., 2017) will be likely to buy those goods to fulfill their environmental requires. Furthermore, this paper examines brands of white products that are giant international brands. For example, Samsung, Toshiba, Sharp and Philips. With deep understanding about product's brands, it is satisfying for customers to take part in this manuscript. Interviews were face-to-face with a small number of representative samples are utilized to pre-test the survey (n = 10) before collecting the data. The objective is to assess if any questionnaire statements are hard to understand due to unfamiliar grammar, language or wording (Colton. et. al., 2015), so creating the construct validity for the questionnaire. Findings of the pre-test indicate that applicants are irritated about the greenwashing term, and they propose that a description should be contained in the survey.

This paper subsequently uses the description of several instances of greenwashing. Data collection was achieved by methods of mall-stop direct interviews utilizing questionnaire (Sehgal. et. al., 2023). This research applied a non-probability convenience sampling technique to select applicants, followed by the sample size was 430 consumers who have bought green products from large grocery stores (Pappu & Quester, 2008).

Data were being collected between July and October in 2023 through three and four-year university students working together who have received training as interviewers. The usage of designated trained interviewers supports to minimize social attractiveness bias (Nederhof, 1985). As shown in Table 1, the rate of response was 79.2%, resulting in 430 valid applicants. This rate of response is high and aids to decrease bias of response (Sehgal. et. al., 2023).

Table 1: Sample Characteristics

N = 430		Frequency	%
Gender	Female	210	49
	Male	220	51
Age	Less than 20	30	6.9
	21- 30	120	27.9
	31 – 40	180	41.8
	41 – 50	90	20.9
	Above 50	10	2.3
Education	Diploma	29	6.7
	Bachelor	220	51.2
	Master	141	32.7
	PhD	40	9.3
Context	Public sector	160	35.1
	Private sector	111	25.8
	students	29	6.7
	unemployed	90	20.9

4.2 Measurement of Constructs:

This paper measured the items by using 7-point Likert scale that are ranging from "1" (strongly disagree) to "7" (strongly agree). To confirm content validity, the scale of measurements have been taken from the prior literature review and adjusted (Trochim et al., 2016), as shown in Table 2. The questionnaire was translated from English into Arabic because Arabic was the native tongue of the target population. Three marketing managers and three academicians reviewed the questionnaire; necessary changes were made, and the completed version was given to the applicants.

Table 2: Measurements Scale

No	Author/Year	Variable	Scale Items
1	Chen and Chang (2012)	Green Brand Equity	Seven-point Likert scales are utilized for the questions, where 1 characterizes strongly disagree and 7 characterizes strongly agree. 1. Even if two brands are identical, it makes sense to purchase this one due to its environmental responsibilities. 2. I would rather purchase this brand even though it had the similar environmental attributes as another one. 3. I would rather purchase from this brand if there are other brands that function as well environmentally as this one. 4. It appears more inventive and better to purchase the brand if the environmental issues of another business are same to this one.
2	(Li. et. al., 2002; Baumgarth, 2015)	Green Brand Attachment	Seven -point Likert scales are utilized for the questions, where 1 characterizes strongly disagree and 7 characterizes strongly agree. 1. This brand feels like it's a part of me; its eco-friendly policies might be one factor. 2. The green methods employed by this brand make me more firmly identify with it. 3. I visit this brand because of its ecological policies, which speak a lot about who I am.

3	(Deniz, Onder, 2017)	**Green Trust**	Seven -point Likert scales are utilized for the questions, where 1 characterizes strongly disagree and 7 characterizes strongly agree. 1. In general, I believe this brand's environment pledges to be trustworthy. 2. In my opinion, this brand's environmental record may be relied upon. 3. In general, I believe the environmental argument made by this brand to be reliable.
4	**Chen (2010) and Butt. et. al., (2017)**	**Green brand Attitude**	Seven -point Likert scales are utilized for the questions, where 1 characterizes strongly disagree and 7 characterizes strongly agree. 1. Buying ecologically friendly products is a wonderful feeling. 2. I'm excited by the availability of eco-friendly brands for the product categories I wish to buy. 3. Among the several product categories, the brand that is favorable to the environment is always the best option. 4-I always feel so happy to find the best value when I buy things from brands that care about the environment.
5	**Cretu and Brodie (2007)**	**Green brand image**	Seven -point Likert scales are utilized for the questions, where 1 characterizes strongly disagree and 7 characterizes strongly agree. 1. This company is thought to have the greatest environmental pledges. 2. This brand has a professional reputation in terms of the environment. 3. This brand performs well in terms of the environment. 4. This brand has a solid reputation for caring about the environment and making reliable environmental claims.
6	**Wymer & RundleThiele, (2016)**	**Brand Loyalty**	Seven -point Likert scales are utilized for the questions, where 1 characterizes strongly disagree and 7 characterizes strongly agree. 1- I am devoted to this product. 2- This product values me. 3- This product trusts me.

5. Statistical Analysis and Results:

In this research, the full descriptive statistics of the research variables was conducted using Python statistical analysis libraries. NumPy and Pandas provide a wide range of competencies to support statistical modeling built on top of the Python programming language. It provides data structures and functions for efficiently manipulating large datasets. In addition, inferential statistics were conducted, including validity tests, confirmatory factor analysis (CFA) , reliability, Structural Equation Modeling (SEM), hypotheses testing using Python and Smart-PLS software.

5.1 Measurements and Descriptive Data:

Descriptive data using Python statistical analysis libraries are presented in Table 3. From the table, each dimension's mean is greater than 4, indicating that respondents generally agree on these dimensions. For every variable, the tolerance and variance inflation factor (VIF) were also looked at. According to (Mandal, 2017), VIF need to be 3.3 or less, and tolerances need to be greater than 0.1. The tolerance for constructs and values of VIF range from 1.350 and 3.334 and 0.243 to 0.670, respectively. According to the results in Table 3, Multi-collinearity is not a problem.

Table 3: Descriptive statistics of constructs

Items	Mean	Std. deviation	Tolerance	VIF
GBE	5.484	0.994	0.375	2.668
GBE1	5.967	1.036	0.432	1.663
GBE2	5.106	1.401	0.430	1.858
GBE3	5.132	1.399	0.502	1.693
GBE4	5.732	1.172	0.450	1.818
GBAT	5.688	0.939	0.262	3.321
GBAT1	5.800	1.087	0.395	1.853
GBAT2	5.706	1.015	0.394	2.049
GBAT3	5.557	1.233	0.381	1.522

Greet Trust	**5.719**	**0.955**	**0.345**	**2.896**
GRT1	**5.724**	**1.130**	**0.389**	**2.001**
GRT2	**5.557**	**1.196**	**0.569**	**1.350**
GRT3	**5.876**	**1.119**	**0.392**	**1.983**
GBA	**5.784**	**0.929**	**0.285**	**3.307**
GBA1	**5.901**	**1.070**	**0.399**	**2.076**
GBA2	**5.610**	**1.166**	**0.322**	**2.618**
GBA3	**5.656**	**1.165**	**0.338**	**2.209**
GBA4	**5.970**	**1.037**	**0.373**	**2.047**
GBI	**5.835**	**1.117**	**0.670**	**1.493**
GBI1	**5.603**	**1.611**	**0.412**	**2.137**
GBI2	**5.643**	**1.399**	**0.672**	**1.357**
GBI3	**6.063**	**1.177**	**0.243**	**3.309**
GBI4	**6.033**	**1.195**	**0.259**	**3.334**
Brand Loyal	**5.837**	**0.931**	**0.384**	**2.603**
BL1	**5.797**	**1.101**	**0.383**	**2.230**
BL2	**5.866**	**1.057**	**0.327**	**2.590**
BL3	**5.704**	**1.138**	**0.372**	**2.126**
BL4	**5.980**	**1.099**	**0.451**	**1.847**

5.2 Conduct Exploratory Factor Analysis:

To find the main factors, XLSTAT software was used to apply an exploratory factor analysis (EFA). In order to extract the factors, the principal components PCA analysis was carried out. For each of the 22 factors, factor loading was computed with initials value = 1 as shown in Table 4.

The Bartlett's test of sphericity $\chi 2 = 5768.739$ (df = 231, p = 0.0001). The Kaiser-Meyer-Olkin (KMO = 0.942).

Table 4: Communalities

	Extraction
GBE1	0.511
GBE2	0.635
GBE3	0.546
GBE4	0.500
GBAT1	0.574
GBAT2	0.546
GBAT3	0.592
GRT1	0.540
GRT2	0.412
GRT3	0.544
GBA1	0.574
GBA2	0.621
GBA3	0.598
GBA4	0.579
GBI1	0.587
GBI2	0.301
GBI3	0.837
GBI4	0.833
BL1	0.658
BL2	0.671
BL3	0.566
BL4	0.492

5.3 Confirmatory factor Analysis (CFA):

Using all 22 items in the measurement model, Smart-PLS software conducted the confirmatory factor analysis. The variables have an

appropriate factor loading, according to the first-order CFA results, therefore they are suitable for data analysis as shown in Table 5.

Table 5: Cross-loading of the variables

	BL	GBA	GBAT	GBE	GBI	GRT
BL1	0.842	0.584	0.593	0.473	0.419	0.530
BL2	0.883	0.650	0.661	0.534	0.407	0.537
BL3	0.855	0.630	0.670	0.545	0.396	0.589
BL4	0.810	0.608	0.570	0.517	0.409	0.511
GBA1	0.630	0.826	0.646	0.616	0.403	0.582
GBA2	0.629	0.875	0.650	0.680	0.413	0.593
GBA3	0.560	0.819	0.645	0.644	0.428	0.603
GBA4	0.624	0.827	0.626	0.590	0.449	0.591
GBAT1	0.647	0.675	0.852	0.607	0.396	0.608
GBAT2	0.617	0.624	0.871	0.563	0.386	0.670
GBAT3	0.605	0.645	0.814	0.647	0.383	0.667
GBE1	0.576	0.679	0.605	0.787	0.408	0.558
GBE2	0.442	0.578	0.567	0.807	0.393	0.559
GBE3	0.319	0.485	0.489	0.748	0.401	0.485
GBE4	0.568	0.634	0.600	0.822	0.405	0.568
GBI1	0.332	0.326	0.347	0.346	0.819	0.368
GBI2	0.324	0.372	0.348	0.377	0.680	0.383
GBI3	0.463	0.517	0.417	0.488	0.922	0.517
GBI4	0.465	0.451	0.420	0.467	0.913	0.496
GRT1	0.565	0.632	0.645	0.617	0.488	0.879
GRT2	0.414	0.497	0.574	0.537	0.388	0.741
GRT3	0.607	0.631	0.693	0.565	0.453	0.875

After evaluation, the model fit was deemed to be appropriate based on the CMIN/DF at 3.362, which is acceptable. The SRMR was excellent at 0.05, which is less than the target of 0.08. The RMSEA was 0.056, which is less than the target of 0.08. The CFI is at 0.933 and the GFI at 0.911, which is at the target of greater than 0.80.

Results show that there is an association between independent variables (GBE, GBAT, Green trust, GBA, GBI) and dependent variable (Brand Loyal).

5.4 Validity and Reliability Test:

The psychometric qualities were evaluated through the utilization of internal consistency and validity. According to Hair et al. (2013) and Harandi et al. (2018), reliability is deemed adequate if the Cronbach's alpha exceeds 0.70. Additionally, factor loading estimates and average variance extracted (AVE) were utilized to measure convergent validity, which measures the correspondence between related constructs.

Table 6 illustrates that all outer loadings of the reflective constructions are significantly higher than the lowest threshold value of 0.60. Convergent validity for each of the constructs is shown by AVE values that are significantly higher than 0.50. According to Lowry and Gaskin (2014), factor loadings between 0.60 ~ 0.70 are regarded as good, and loadings above 0.70 as very good. Hence, the factor loadings fall inside the permitted bounds.

The cross-loading criterion and the Fornell and Larcker (1981) criterion were computed. Table 7 presents the relationships among the latent variables. Its indications that there is proven discriminant validity among the constructs because the correlations between the constructions in the major diameter and other constructs are higher than those between other constructs.

Table 6: Construct Validity

Construct	Items	Standard Loading	Cronbach's alpha	AVE
GBE	GBE1	0.787	0.805	0.626
	GBE2	0.807		
	GBE3	0.748		
	GBE3	0.822		
GBAT	GBAT1	0.827	0.801	0.716
	GBAT2	0.852		
	GBAT3	0.871		
GRT	GRT1	0.879	0.779	0.696
	GRT2	0.741		
	GRT3	0.875		
GBA	GBA1	0.826	0.857	0.700
	GBA2	0.875		
	GBA3	0.819		
	GBA4	0.827		
GBI	GBI1	0.819	0.855	0.704
	GBI2	0.700		
	GBI3	0.922		
	GBI4	0.913		
BL	BL1	0.842	0.869	0.719
	BL2	0.883		
	BL3	0.855		
	BL4	0.810		

Table 7: Discriminant validity - Fornell -Larcker criterion

	BL	GBA	GBAT	GBE	GBI	GRT
BL	0.848					
GBA	0.730	0.837				
GBAT	0.737	0.767	0.846			
GBE	0.611	0.756	0.718	0.791		
GBI	0.481	0.505	0.459	0.507	0.839	
GRT	0.640	0.707	0.766	0.687	0.534	0.834

5.5 PLS-SEM Model Assessment:

In our study, R^2 and Q^2 were additionally acquired. As a result, the Q^2 value shows the model's predictive relevance, whilst the magnitude of R^2 values is a measure of prediction accuracy. Q^2 values for a reflecting endogenous concept in SEM models that are greater than zero suggest that the route model is predictively relevant for that specific construct (Hair et al., 2013). For GBAT variable (R^2 is 0.515 and Q^2 predict is 0.511). For Green Trust variable (R^2 is 0.472 and Q^2 predict is 0.467). For GBA variable (R^2 is 0.572 and Q^2 predict is 0.569). For GBI variable (R^2 is 0.257and Q^2 predict is 0.251). For Brand Loyal variable (R^2 is 0.618 and Q^2 predict is 0.611).

The Bootstrapping approach was employed to obtain the significance of the path coefficients. Two-tailed test was used with 5,000 samples, sig. level = 5% at 95% confidence intervals. As shown in Figure 2, all hypotheses were confirmed. The proposed causal paths were computed in order to evaluate the structural links depicted in the model. The results shown in Table 8 and state that the Green Brand Equity positively affect Brand loyalty. All hypothesis were supported.
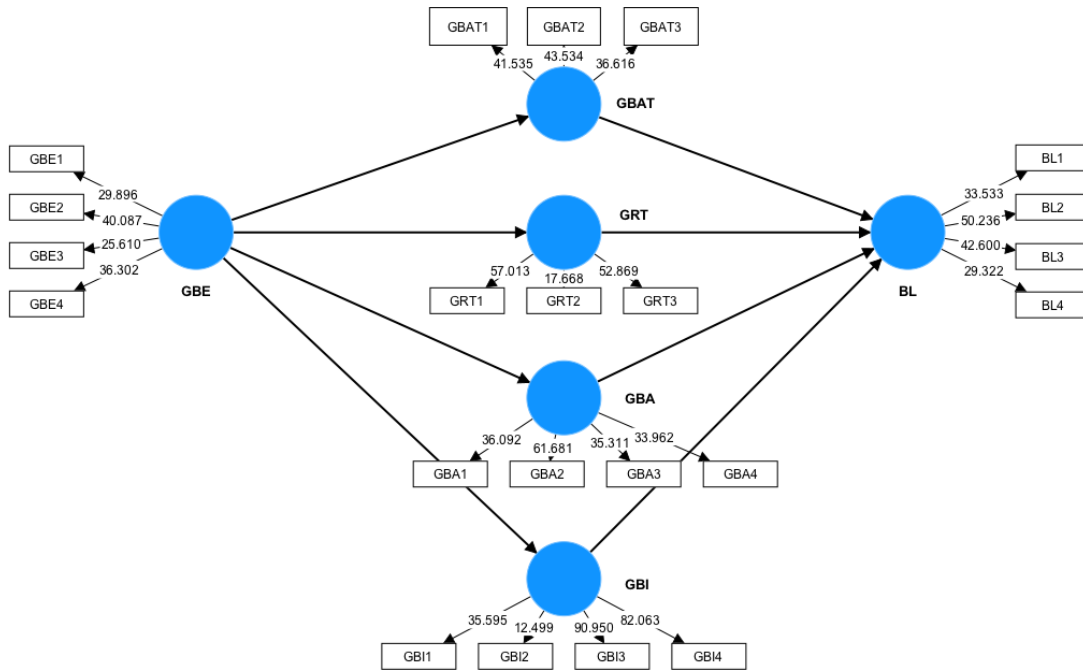
Figure 2: PLS-SEM Structural Model

Table 8: Path Analysis

Hypothesis	Paths	Total effects	Two-tailed test
H1	GBE → GBAT	0.718	20.819
H2	GBE → GRT	0.687	16.800
H3	GBE → GBA	0.756	24.318
H4	GBE → GBI	0.507	8.883
H5	GBAT → BL	0.393	5.954
H6	GRT → BL	0.035	0.521
H7	GBA → BL	0.351	5.997
H8	GBI → BL	0.104	2.011

As recommended by Picon et al. (2014), we use the bootstrapping approach to test the mediation effect. In the analysis of the mediator role, two-tailed test was used with 5,000 samples, sig. level = 5% at 95% confidence intervals. In Table 9 , we analyze the specific indirect effects per mediator variable. In Table 10 , we analyze the total indirect effect for the total mediation via all mediators. From both tables, results show that for each construct, the indirect effect is significant, as a result the total effect is also significant. Thus, show complementary partial mediation.

Table 9: Specific indirect effects

	Specific indirect effects	Two-tailed test
GBE → GBI → BL	0.053	1.978
GBE → GBAT →BL	0.282	5.725
GBE → GRT → BL	0.024	0.522
GBE → GBA → BL	0.265	5.941

Table 10: Total indirect effects

	Total indirect effects	Two-tailed test
GBE → BL	0.624	15.158

6. Discussion and Contribution:

6.1 Discussion of findings:

Growing consumer awareness of environmental issues is pushing marketers to embrace eco-friendly strategies. In addition to drawing in environmentally conscientious customers, these eco-friendly marketing strategies give advertisers a long-term commercial opportunity. Products that don't have a strong green brand may not succeed in the marketplace. But when it comes to the topic of green brand equity, there isn't much to investigate (Rea, 2014). As a result, the main goals of this research are to scientifically examine: 1. How brand loyalty is affected by green brand equity (GBE). 2. How the relationships between GBE and brand loyalty are mediated by GBAT, Green Trust, GBA, and GBI.

The findings of this investigation allow for the deduction of several conclusions. First, brand loyalty will be positively impacted by people with greater values of green brand equity (Sadek, 2015). According to Moradi and Zarei (2012), Customers' brand choices and buying intentions are also influenced by brand equity. These findings also support earlier research showing a favorable association between green brand equity and brand loyalty.

Third, the findings of Larceneux. et. al., (2012), who looked at the mediating roles of GBAT, Green Trust, GBA, and GBI, are consistent with this outcome. These findings are consistent with the finding that consumers who value the environment and would prefer to buy green products are more likely to be aware of green marketing initiatives (Davari & Strutton, 2014). Furthermore, the study's results show that customers with greater awareness of green marketing also prioritize higher levels of customer value; hence, when consumers' perceptions of green marketing are strong, their value in relation to brand equity is also elevated. Fourth, Rashid (2014) concurs with the findings. Customers with higher levels of green brand loyalty prefer to focus on green trust, which is positively correlated with brand loyalty.

6.2 Theoretical implications:

Owing to the dearth of research on the application of theories of sustainable development and signaling in marketing, a theoretical model was created in this study to examine the unique impact of GBE on brand loyalty. By investigating the effect of GBE on Brand Loyalty in relation to the mediating roles of GBAT, Green Trust, GBA, and GBI, this study aims to advance earlier studies.

In order to better comprehend green brand equity, this study offers a framework made up of six innovative constructs: green brand equity, green brand attachment, green brand attitude, green trust, green brand image, and brand loyalty. Many researches have been conducted on green marketing, however none of them have found a connection between brand attitude and green branding or marketing. Nonetheless, one of the key factors influencing consumer behavior is attitude. One of the most crucial psychological traits for marketers to focus on in order to get a long-term competitive edge is consumer attitude.

6.3 Managerial implications:

The results of our research have a number of important ramifications because GBA, GREEN TRUST, GBI, GBAT, and GBE are important factors that influence brand loyalty. First, this study expands on the marketing literature by introducing the idea of GBA, GREEN TRUST, GBI, GBAT, and GBE. Additionally, it gives marketers and brand managers a clear understanding of how to improve green signals, which a company can communicate to customers through GBE. Brand managers and marketers may increase B2C buyers' loyalty by strengthening the emotional connections between them and green brands.

As a result, brand managers ought to concentrate first on incorporating eco-friendly elements into their goods and then bolstering them with eco-friendly signals. Therefore, it is advised that brand and marketing managers of companies that produce green products set up avenues for B2C buyers to offer feedback and to stop the environment from being neglected.

Secondly, our research enhances comprehension of the significance of mindset, and brand loyalty in building connections and enhancing customer engagement. Thus, by incorporating environmental signals into green marketing mix tactics and employing creative approaches, B2C buyers will find it simpler to assess green products. By lowering their environmental concerns and putting out reliable signals, this will draw in more customers.

Customers are becoming more conscious of the environment and aware that the things they buy could have a negative effect on the environment. Thus, in a setting where green advertising and brand trust are brittle. Additionally, as customers are more likely to recognize brands that are responsible, businesses can work with environmental organizations and groups to host environmental protection workshops and demonstrate their commitment to the environment.

Third, establishing a partnership between green brand and B2C consumers—which creates forth GBAT, GSBC, and GBA—is another practical aspect of GBE that should to be taken into consideration, especially in the context of B2C. Green brands are able to satisfy consumer and environmental expectations when they have strong customer relationships. Consequently, this study recommends that managers and marketers work to increase GBE in their customers by giving them correct information on the advantages of utilizing green products.

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6.4 Limitations and Future Researches:

Like other research, this one has certain limitations. The primary restriction has to do with the research's geographic scope, which was Egypt in this case. Therefore, in order to establish the essential foundation for comparison, it is advised that the research be repeated in other nations or a combination of developed and developing nations to strengthen the validity of the developed model. To develop the suggested model, additional green marketing structures can be found through future study. Many businesses engage in greenwashing as a means of boosting sales and convincing customers to purchase their goods. The effect of greenwashing on consumers' views and a new concept of green self-brand connection (GSBC) is another intriguing area for further investigation. Future studies may also pinpoint the causes and effects of a new concept of green self-brand connection (GSBC).

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