

## Green Brand Positioning in the Online Environment

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The online environment has been influential in building corporate brands. This study explores green brand positioning in the online environment via content analysis and network analysis approaches. Using the techniques of centrality measure and structural equivalence, the study offers a network perspective on content and structural relationships of green brand positioning in corporate websites. This study extends brand positioning knowledge to online green branding contexts and offers researchers a new approach to explore the structural relationships among positioning elements. The results have significant implications for green brands' development of e-business positioning strategies.

*Keywords:* green brand positioning, online environment, content analysis, network analysis

### Introduction

In recent years, because of the enormous amount of environmental pollution that is directly associated with industrial manufacturing around the world, leaders in business, government, and society have been paying more attention to environmental sustainability. Companies are being forced to change their behaviors to comply with society's environmental concerns and governmental eco-regulation. More and more companies are willing to act in socially responsible and environmentally aware ways, such as by introducing eco-friendly products and reducing the environmental impact of existing products. Being a green brand offers companies an opportunity to achieve a competitive advantage.

Green branding has been an important academic research topic over the past years, and it has extended to several issues such as green brand equity (Chen, 2010), green brand association and perceptions (Montoro-Rios, Luque-Martinez, & Rodriguez-Molina, 2008), green brand competitiveness (Darnall, 2008), and green brand positioning (Hartmann, Ibáñez, & Sainz, 2005; Haung, Pan, & Lin, 2008). Among these themes, brand positioning has been a significant issue that has drawn attention from green brand researchers. In studying green brand positioning, some researchers have focused on typologies of green positioning strategies and their effects on consumers (e.g., Fuchs & Diamantopoulos, 2010; Hartmann et al., 2005). Nonetheless, their efforts have not been concerned with the online context.

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The online context, or Internet, has had a major impact on building corporate brands (Kapferer, 2012). Previous research into online branding has centered on online brand equity (Argyriou, Kitchen, & Melewar, 2006; Christodoulides, de Chernatony, Furrer, Shiu, & Abimbola, 2006), online brand personality (Chung & Ahn, 2013; Lin, 2009; Okazaki 2006; Opoku et al., 2009; Opoku & Hinson, 2006), online brand images (Clauser, 2001; Ind & Rioldino, 2001; Merrilees & Fry, 2003; Silva & Alwi, 2008; Stuart & Jones, 2004), online brand perceptions (Chiang, Lin, & Wang, 2008; Kim, Shaw, & Schneider 2003), and online brand positioning (Aggarwal, Vaidyanathan, & Venkatesh, 2009; Dou, Lim, Su, Zhou, & Cui, 2010; Virtsonis & Harridge-March, 2009). Among these issues, some researchers have focused on online brand positioning as a significant theme, but this topic has been limited to the context of retail branding (Aggarwal et al., 2009), search engines (Dou et al., 2010), and service branding (Virtsonis & Harridge-March, 2009). These studies have not revealed the structural relationships of positioning attributes for brands. This study suggests that the online environment is significant for a green brand to develop effective positioning strategies.

Brand positioning is the act of designing a brand's offering and image to occupy a distinctive place in the target market's mind. Therefore, this study assumes that the network nature of green brand positioning in the online environment that contains the structure of the inherent content (brands and their positioning attributes) and relationships (links between brands and their positioning attributes) is represented in the consumer's mind. Network analysis is an approach that examines both the content and the pattern of relationships, and it consists of graphical representation techniques and quantitative analysis. This method has advantages over quantitative mapping techniques in the standardization of statistical techniques compared with the qualitative concept maps. Although this approach has been discussed in the brand association literature by marketing researchers since the 1990s (e.g., Henderson, Iacobucci, & Calder, 1998; Krishnan, 1996), its applications in the area of brand positioning are still in their infancy.

Considering the network nature of green brand positioning in consumers' minds, network analysis seems appropriate for exploring green brand positioning in the online context. Accordingly, this study attempts to explore green brand positioning in the online environment via content analysis and network analysis approaches. Using the techniques of centrality measure and structural equivalence, the study offers a network perspective on content and structural relationships of green brand positioning embedded in corporate websites.

This study examines corporate websites, which are an ideal venue for two reasons. First, previous research has recognized that the image, trust, and reputation communicated via corporate websites can positively influence stakeholder perceptions about brands and companies (Roig, Pritchard, & Morgan, 2010). Therefore, corporate websites can be seen as platforms on which to build a distinctive or "constructed" green brand positioning. Second, with the advance of Internet technology, it is common for companies to build their own websites as platforms to communicate with consumers. The green brands selected in this study are medium-size or large global brands, and they present a range of themes in their website text. Thus, their corporate websites offer sufficient positioning information for inclusive analysis and are suitable online contexts for this study.

This study contributes to the literature in several ways. First, it extends brand positioning knowledge to online green branding contexts. Second, it employs network analysis rather than conventional positioning analysis to investigate green brand positioning, offering academic researchers a new approach to explore the structural relationships among positioning elements. Finally, the managerial implications of this study will benefit brand practitioners. The next section provides a review of the literature on green brand positioning and is followed by an overview of branding in the online environment. Next, I present the research method and discuss the findings. Finally, I outline the conclusions and the research's implications.

## **Literature Review**

### ***Green Brand Positioning***

Arnott (1994) defines positioning as management's attempt to modify the tangible characteristics and the intangible perceptions of a marketable offering in relation to the competition. A clear positioning strategy can ensure that the elements of the marketing program are consistent and supportive (Aaker & Shansby, 1982), which is important for influencing the perceptions of target consumers. A good understanding of what brand positioning entails is a key requisite for any company or brand involved in branding development.

Brand positioning has also been a significant topic of interest among green brand researchers. In studying green brand positioning, some researchers have focused on types of green positioning strategies and their effects on consumers. For example, Fuchs and Diamantopoulos (2010) summarized the main positioning bases commonly discussed in the literature. They categorized the positioning based on different levels of abstraction, including *features (concrete attributes)*, *abstract attributes*, *direct (functional) benefits*, *indirect (experiential/ symbolic) benefits*, and *surrogate positioning*. The authors suggested that the type of positioning strategy used by a company affects the positioning success of its brand. Similar classifications of positioning are revealed in green brand positioning strategies. Hartmann et al. (2005) have classified green brand positioning strategies as functional or emotional. They note that a green positioning strategy based on functional brand attributes intends to build brand associations by delivering information on environmentally sound product attributes, such as production processes, product use, and/or product elimination (e.g., Meffert & Kirchgeorg, 1998; Peattie, 1995). Furthermore, the authors address at least three conceptually different types of emotional brand benefits as an alternative or complementary strategy to green positioning: (1) a feeling of well-being (warm glow) associated with acting in an altruistic way; (2) auto-expression benefits through the socially visible consumption of green brands; and (3) nature-related benefits stemming from sensations and feelings normally experienced through contact with nature.

The two types of green brand positioning (functional and emotional) are related to the impact on consumer perceptions of a brand being good for the environment, as shown in several studies. In a test of a two-dimensional functional/emotional green brand model, Hartmann et al. (2005) found that functional positioning results in a strong cognitive perception of an environmentally friendly brand, whereas an emotional position suggests a brand association with nature. The results revealed that, ultimately, a

combined strategy has the most significant results in generating positive brand attitudes, whereas the most successful green brands are associated with either alternative technology or a green corporate philosophy. An empirical study by Haung et al. (2008) elaborated on the relationship between green brand positioning and green purchase intention, especially when using green brand attitude as a mediating variable.

Although some efforts have been made to explore green brand positioning, none have addressed the topic in an online context. The online context, or Internet, through Web presence, has had a major impact on building corporate brands (Kapferer, 2012; Stuart & Jones, 2004). By communicating corporate brand value online, the brand value is clearly articulated, concise, and well defined (Balmer & Gray, 2003). This study suggests that the online environment is also significant for a green brand to develop effective positioning strategies. The next section reviews previous research around online branding, offering the rationale for this study.

### ***Branding in the Online Environment***

Previous research that examines the Internet as a medium for branding (Okazaki, 2006; Rowley, 2004a, 2004b) has centered on the following five issues: *online brand equity*, *online brand personality*, *online brand images*, *online brand perceptions*, and *online brand positioning*.

**Online brand equity.** Some previous studies have discussed the issue of online brand equity (e.g., Argyriou et al., 2006; Christodoulides & de Chernatony, 2004; Christodoulides et al., 2006). For example, Christodoulides and de Chernatony (2004) approached the subject of brand equity measurement on- and off-line. They followed Aaker's (1996) guidelines to build a new brand equity measurement system. In addition, Argyriou et al. (2006) developed a series of propositions to demonstrate how corporate brand entities may manage their brand equity at their corporate website interfaces. Building on existing conceptual and empirical data, they present a theoretical framework and research agenda for such a relationship.

**Online brand personality.** The second line of research on online branding has mainly centered on the online brand personality (e.g., Chung & Ahn, 2013; Lin, 2009; Okazaki, 2006; Opoku et al., 2009; Opoku & Hinson, 2006). For example, Okazaki (2006) attempted to identify the dimensions of online brand personality that American firms intend to create in the minds of online consumers by using "forms of online communications" partially based on Ghose and Dou's (1998) earlier study. The results of multiple regression analyses confirmed modest but consistent associations between the intended brand personality dimensions and the forms of online communications. More recently, Chung and Ahn (2013) explored the concept of online brand personality, creation of online brand personality, and the role of personal difference in terms of advertising effectiveness—memory and attitude. They found that website structure is an important factor in people's attitudes toward a website. Specifically, an individual's personality is an important moderator of the effects of website structure, and an individual's personality and brand personality have a significant interaction effect on attitude and behavioral intention.

**Online brand images.** A wealth of research has explored corporate brand images, particularly in an online context, including conceptual (Christodoulides & de Chernatony, 2004; Clauser, 2001; Ind & Riordino, 2001; Stuart & Jones, 2004) and empirical approaches (Merrilees & Fry, 2003). For example, Silva and Alwi (2008) examined the brand attributes that retailers need to emphasize and address in order to achieve a positive representation of corporate brand images in an online setting. They investigated the association between functional brand evaluation (brand attributes) and emotional brand evaluation (the corporate brand image). Moreover, previous studies have discussed the attributes that affect an online retailer's service quality, online store image, and online brand image. Although there is yet no consensus on this issue (Wolfenbarger & Gilly, 2003; Zeithaml, 2002), the frequently cited attributes that have a significant effect on e-service quality, as well as on online branding, have been recognized (de Chernatony & Christodoulides, 2004; Zeithaml, 2002), and they include the following: (1) reliability/fulfillment (product return, delivery process); (2) customer service/care/responsiveness; (3) ease of use/website design/site design; (4) financial security/security/privacy/trust; and (5) interactivity/personalization/customization.

**Online brand perceptions.** In studies of website communications, researchers have explored the important elements of websites that may influence a consumer's perception of a brand (e.g., Chiang et al., 2008; Kim et al., 2003). For example, Kim et al. (2003) reviewed a wide range of website features, such as speed of loading, navigability, usability and intuitiveness of the interface, currency of the information, structure, and support. Specifically, a website's users are more concerned with information content (Alper, 1999). This fact gives the current study a rationale for focusing on the content of messages related to green statements embedded in corporate websites. These messages form the elements of green brand positioning.

**Online brand positioning.** The issues related to online brand positioning include analytical approaches to online brand positioning (Aggarwal et al., 2009), factors for creating brand positioning online (Dou et al., 2010), and brand positioning in the business-to-business online environment (Virtsonis & Harridge-March, 2009). For example, Virtsonis and Harridge-March (2009) examined the way in which brand positioning elements are manifested in the business-to-business online environment. They developed a framework to discover how brand positioning is operationalized in the online environment. They concluded by making recommendations about how the framework could be used by practitioners to reconcile their online and off-line branding activities.

The issues related to online branding have drawn much attention from brand researchers. Among these issues, online brand positioning has been a significant theme. However, examinations of this topic have been limited to the context of retail shopping branding (Aggarwal et al., 2009), search engines (Dou et al., 2010), and service branding (Virtsonis & Harridge-March, 2009). In addition, these studies have not used the network analysis approach to online brand positioning to explore the structural relationships among the brand positioning elements. These gaps offer an opportunity to explore green brand positioning in an online environment via the integration of content analysis and network analysis approaches.

## Method

This research is of an exploratory nature with an attempt to develop a framework that describes the various positioning elements manifested in the corporate websites of green brands. The design of this study adopts a combination of different methodological strategies, including content analysis and networks analysis. During the process of data gathering and analysis, an explorative qualitative study was conducted to classify the elements of green brand positioning. This process was followed by a quantitative inquiry of network analysis, targeting issues that evolved from the exploratory phase.

### *Data Collection*

A list of the top 50 global green brands—spanning 11 countries and 13 industries—was compiled from data provided by the brand consultant company Interbrand. The advantage of using the green brands collected from the Interbrand website is the objectivity of the evaluative criteria used by Interbrand, which has been recognized for many years. The top green brands were generated in two stages by combining the perspectives from both experts and consumers. The sample comprises medium-size or large global firms that include a range of themes in their website text, so that the analysis was more inclusive, as opposed to focusing on small, local enterprises that feature relatively poor online content. The URLs related to green brand positioning for the sample companies were obtained via the Interbrand website. These addresses were used as evaluative sources of global green brands by Interbrand. Each of the corporate websites was accessed and viewed to ascertain what text they contained that might be perceived as brand positioning. Data for the study were gathered and analyzed over a period of about two months.

### *Data Analysis*

**Content analysis.** As with much qualitative research, data analysis took place at the same time as data collection. I used content analysis to classify categories and concepts that emerged from the collected data. The research employed open coding to analyze subjects and themes arising from the text in the corporate websites related to corporate environmental commitment or responsibility, which constitute the green brand positioning components. Codes varied and were recognized as mutually exclusive and separate themes. The construction of themes continued until no additional data could be added to the categories. NVivo software was used to assist with coding and memo writing.

The study employed two naming strategies for open codes: *in vivo codes* and *constructed codes*. *In vivo codes* are important sources for naming categories; the codes are memorable terms that attract immediate attention (Strauss & Corbin, 1998). I named the codes based on the text that is explicitly classified and focused on in detail on the corporate websites. *Constructed codes* represent coded data from *in vivo codes* that are created by the researcher (Khandkar, 2009). Although other researchers may identify additional codes from the same data set, the codes selected for this study were appropriate for the context. The naming strategies are illustrated by several examples in Table 1 that reveal how I coded the text in websites at this stage.

**Table 1. Examples of Open Coding.**

Naming type	Example of environmental commitment or responsibility	Name of coded concept
In vivo codes	<ul style="list-style-type: none"> <li>■ <b>Biodiversity Initiatives.</b> Global warming and the loss of diversity among wild plant and animal species are among the most serious environmental issues. Canon's corporate philosophy of Kyosei embraces <b>biodiversity</b> by taking into account the importance of protecting the environment when conducting business. (Canon)</li> <li>■ Siemens designs, develops and installs systems to support our nation's continued need for energy generation through <b>innovative</b>, environmentally responsible <b>technology</b> and cost-effective products and solutions. Siemens manufactures, installs and maintains equipment used for producing and delivering electricity, including turbines, generators, control systems, switchgear, transformers, motors, protective relays and power metering equipment. (Siemens)</li> <li>■ <i>Environmental Practices.</i> From Battle Creek to Korea, Kellogg Company strives to keep our communities clean and safe. We use heat recovery systems, convert waste food to animal feed, practice water conservation and reuse, and participate in packaging <b>recycling</b> programs. (Kellogg)</li> </ul>	<p>Biodiversity</p> <p>Innovative technology</p> <p>Recyclability</p>
Constructed codes	<ul style="list-style-type: none"> <li>■ <i>Usage Proposals to Customers—Distributing Information on Environmentally Conscious Products.</i> There is a growing need in market for environmental consciousness in recent years. It brings a corresponding surge in enquiries from customers regarding the environmental consciousness of Canon products. In order <b>to respond to such market demands</b>, we have aggressively transmitted information on environmental aspects of our products on our website and other media. (Canon)</li> <li>■ <i>Saving Energy and Resources.</i> Siemens is dedicated to reducing the consumption of energy and natural resources in our nations' facilities. Siemens products, services and solutions monitor and manage energy consumption and <b>help our customers implement their green building strategies</b>. Our guaranteed performance-based solutions leverage energy savings to optimize building performance. (Siemens)</li> <li>■ The term "sustainability" for HSBC is about running our business for the long term. It is about <b>investing in customer relationships</b>; ensuring that our governance is robust; and that our risk appetite is prudently managed. This approach allows us to contribute to socio-economic development and environmental protection in a number of ways. (HSBC)</li> </ul>	Customer orientation

Intra- and intercoder reliability were ensured in this study. After coding the data the first time, I refined the categories and rechecked the codes one month later to ensure intracoder reliability. The results of the rechecking confirmed that all the categorized data were placed in the appropriate classes, revealing consistency within a single coder. Nonetheless, a few of the codes were renamed for more explicit meanings. For example, I substituted "commuting of employees" for "commuting." This method is referred to as stability reliability by Krippendorff (2013). Measuring stability may be an analyst's first step in establishing the reliability of data due to the weakest form of reliability; thus, this study employed a second researcher to work independently and apply the same recoding instruction to the same units of analysis. This measure of reliability is called replicability (see Krippendorff, 2013), which is a far stronger measure of reliability than stability. The second researcher then rechecked the presence (coded as 1) or absence (coded as 0) of positioning elements at random and then compared the renditions with mine. Intercoder reliability was measured using the following formula from Miles and Huberman (1994):  $\text{Reliability} = \frac{\text{number of agreements}}{\text{total number of agreements} + \text{disagreements}}$ . We then computed intercoder reliability for the data, which was moderately high (0.83). Disagreements were rechecked, discussed, and corrected until the two researchers agreed on all the themes and quotes that captured them.

**Network analysis method.** Network analysis or social network analysis, a quantitative technique derived from graph theory (Scott, 2000; Wasserman & Faust, 1994), examines both the content and the pattern of relationships to determine how and what resources flow from one actor to another (Haythornthwaite, 1996). Generally, the interactive relationship among a set of actors can be portrayed as a social network (Gelsing, 1992). In this study, the nodes in the network represent these elements, and the connections between them represent source commonalities of green brands that link elements. This article depicts the structural relationships among green brand positioning elements via the construction of an adjacency matrix, centrality measures, and analysis of structural equivalence.

*Construction of an adjacency matrix.* Based on the relationship of green brand positioning elements to the sources of green brands, an adjacency matrix was constructed as a prerequisite for generating networks. The study focused on the existence or absence of elements across all green brands instead of the strength of the attributes—or the frequency of occurrence of the identified themes in the each case. The existence or absence of green positioning elements across all brands was coded as 1 or 0 in their relationship matrix, facilitating the following network analyses.

*Centrality measures.* Centrality measures are indexes of importance based on the location of a node within a network relative to other nodes. The following three types of centrality can be measured: degree, betweenness, and closeness (Freeman, 1979; Knoke & Kuklinski, 1982; Wasserman & Faust, 1994). *Degree centrality* refers to the number of other points that have a direct tie to that node (Freeman, 1979). *Betweenness centrality* represents the probability of a node being activated using a particular path as a node is connected through multiple paths. *Closeness centrality* measures how close a node is to the other nodes (Sabidussi, 1996). Although these three indexes are slight variants on the construct of network centrality, each is a helpful tool for this study to reveal the importance of individual elements in the whole network.



*Structural equivalence.* The concept of structural equivalence applies to not only roles but positions (Scott, 2000). A position within a social network is defined by an actor's pattern of social relations (Wasserman & Faust, 1994). Actors who share a similar pattern of social relations are deemed equivalent (Sailer, 1978). This article clusters the elements of green brand positioning based on the pattern of combination ties. A set of positions is established based on the structure of the ties in the element network. Elements with a sufficiently similar combination pattern will be grouped into a position and treated as structurally equivalent. A block model, introduced by White, Boorman, and Breiger (1976), is a methodology for constructing a structural equivalence relation. In this article, the result of block modeling is obtained from CONCOR. CONCOR is a rather complex and cumbersome iterative procedure, and details regarding CONCOR can be found in Wasserman and Faust (1994).

## Results

### ***Online Green Brand Positioning Elements***

Content analysis yielded 22 green brand positioning elements (see Table 2). These elements took the form of textual content on a Web page. Each of the elements generated in the current study was coded via semantic interpretation. Table 2 describes the meanings involved in these elements and how these positioning elements are related to green. The results of the content analysis were used to develop a network of green brand positioning elements in which their structural relationships were explored.

***Table 2. Results of Content Analysis.***

Number	Element ( <i>N</i> = 22)	Concepts Involved
1	Gas emissions	Carbon/CO <sub>2</sub> reduction, CO <sub>2</sub> emission management, controlling emissions, clean air, climate change and protection, reducing emissions of greenhouse gases, interior emissions, and carbon footprint
2	Energy management	Energy management, energy generation, energy use and alternative energy, conservation of resources, waste management, and water use/management/conservation
3	Biodiversity	Biodiversity conservation/protection/enhancement and preservation of the natural habitat
4	Product design	Embedding environmental considerations into product design and development, designing products for lesser packaging, recycling, and reducing waste (e.g., cutting down water usage), sustainable design, sustainable packaging, eco-design, and eco-labels
5	Product material	Sustainable materials, raw materials, strengthening the management of chemical substances in products, prohibiting the use of hazardous substances for products, product safety, eco-materials, and PVC elimination
6	Working condition	Promoting the welfare, health, and safety of employees and providing eco-friendly workplaces and restaurants

7	Transportation	Pursuing transport efficiency and reducing the volume of CO <sub>2</sub> emissions in logistics activities, reducing resources used in transport, using resources effectively in logistics, and providing sustainability solutions of intelligent transportation systems
8	Supply chain	Asking suppliers to provide details and information about sustainability strategies and activities, Supply Chains Act, supply chain management, and assessing and training suppliers
9	Energy efficiency and value of product use	Enhancing efficient use of materials, providing energy-efficient products, improving product value during use, and providing energy efficiency information
10	Recyclability	Recyclable products/materials/batteries/packaging after use, recycling programs, greener disposal, recycling-oriented manufacturing, and renewable energy
11	Smart buildings	Offering smart/sustainable/ environmentally friendly buildings, green offices, and eco-friendly workplaces
12	Commuting of employees	Reducing emissions from business travel by hybrid vehicles, company cars, or free coaches for employees; using electric scooters for the delivery of internal mail; offering video conferencing; and supporting employees to buy bicycles
13	Innovative technology	Focusing on innovative and advanced environmental IT/technology applied in products or manufacturing process
14	Research and development	Focusing on research (e.g., animal testing and experiment) for promoting technological development toward environmental improvement
15	Providing advice/solutions	Providing advice/solutions and green building energy consulting services and helping suppliers to develop an eco-plan
16	Customer orientation	Responding to market demands, meeting the needs of consumers, helping customers implement their green strategies, investing in customer relationships, encouraging customer interaction, co-innovating with the ecosystems of customers, and engaging in communication initiatives to enhance mutual understanding between the company and customers
17	Partnership	Cofunding independent research with governmental organizations; working with the public and private sectors and other stakeholders on solutions; collaborating with environmental nongovernmental organizations; supporting the Desert Planting Volunteer Association in its Forest Project initiative; promoting environmental activities in cooperation with business partners; partnering with Conservation International, manufacturing partners, and biodiversity experts around the world; getting funds from customers for the Sow a Seed project; investing in communities for sustainable development; and working with farmers and applying comprehensive agricultural science to advance the state of sustainable agriculture

18	External activities of environmental communication	Tree planting activities and environmental education programs for children worldwide to extend green innovations that lead to sustainable lifestyles around the world, environmental communication activities, donations, Eco Relay activity, annual report and ecomagination.com, Excellence Manufacturing Program, Social Contribution Program, Sow a Seed project, and participating in the climate debate
19	Endorsements and regulatory compliance	Environmental awards/recognition/certification and compliance with all laws, regulations, official standards, and directives relating to the protection of the environment
20	Internal training and education of environment	Environmental education programs and training courses for employees
21	Transport of customers	Offering a home-delivery service for customers (e.g., a free bus)
22	Encouraging employees to engage in environmental activities	Tree-planting initiatives, Team Eco Challenge competition, social projects, Regional Environment Conference, informational campaigns, local volunteering programs, and employee rewards

### **Network Structure Analysis**

This study used an adjacency matrix of elements to develop the element network. The overall relationship among the 22 elements is revealed by the adjacency matrix denoted as  $[a_{ij}]_{22 \times 22}$ , in which the adjacency matrix contains binary values; entry  $a_{ij}$  equals 1 if element  $i$  and element  $j$  are adopted by the same green brands, but it equals 0 if they have different sources of green brands. The element network revealed a dense and complicated relationship among the 22 elements. This study conducted two additional main phases of network analyses to capture the structural relationships among elements in terms of individual and group perspectives: *centrality measures* and *analysis of structural equivalence*.

**Centrality: the importance of individual elements.** Green brand positioning elements with the highest values in all three centrality measures included 12 elements: *gas emissions, energy management, product design, product material, supply chain, energy efficiency and value of product use, recyclability, smart buildings, innovative technology, research and development, partnership, endorsements and regulatory compliance* (see Table 3). The high values of these elements indicate that each of these elements was highly related to others due to the same sources of green brands and that they are frequently used as a candidate for positioning set by several green brands. In contrast, "commuting of employees" had the lowest value in all three centrality measures. Accordingly, it was more likely to be combined with fewer elements as a positioning strategy in a green brand.

The results of centrality measures revealed the degree to which an individual element was adopted by the green brands for positioning. Elements were grouped via structural equivalence to understand combination relationships between the elements.

**Table 3. Centrality Measures of the Green Brand Positioning Elements.**

Green brand positioning elements	Degree	Betweenness	Closeness
Gas emissions	21	0.003789	1
Energy management	21	0.003789	1
Product design	21	0.003789	1
Product material	21	0.003789	1
Supply chain	21	0.003789	1
Energy efficiency and value of product use	21	0.003789	1
Recyclability	21	0.003789	1
Smart buildings	21	0.003789	1
Innovative technology	21	0.003789	1
Research and development	21	0.003789	1
Partnership	21	0.003789	1
Endorsements and regulatory compliance	21	0.003789	1
Working conditions	20	0.002193	0.954545
Transportation	20	0.002193	0.954545
Customer orientation	20	0.00179	0.954545
External activities of environmental communication	20	0.00179	0.954545
Encouraging employees to engage in environmental activities	20	0.00179	0.954545
Transport of customers	19	0.001914	0.913043
Biodiversity	18	0	0.875
Internal training and education of environment	18	0	0.875
Providing advice/solutions	16	0	0.807692
Commuting of employees	15	0	0.777778

**Structural equivalence: combination relations between the elements.** This study clustered the elements to detect the possible combinations of green brand positioning elements. The grouping method used here was based on the network analysis of structural equivalence. Elements that were sufficiently similar in their combination patterns were grouped into a block that was treated as equivalent. The structural equivalence in the networks of green brand positioning elements was analyzed through CONCOR procedures and the following approaches: establishing a blocked model and generating a reduced graph.

*Establishing a blocked model.* How many blocks of structurally equivalent elements should be in this network? No one correct answer was found. Several clustering techniques were evaluated for how well they fit the data. We set the number of split as two in UCINET to merge some small blocks into a possibly related block, resulting in four blocks that clustered 22 elements (see Table 4).

*Generating a reduced graph.* I defined and constructed density and image matrices to generate a reduced graph for exploring the relationship between blocks.

The density matrix for four-position clustering revealed an insight into positional relationships: the density of relationships between the same and different blocks of green brand positioning elements (see Table 5). The density matrix was used to construct the image matrix. Following the method suggested by Scott (2000)—that the overall density could be used as a cutoff value  $\alpha$  for constructing the image matrix and to examine the real relationship between positions.  $\alpha$  is a criterion such that densities above  $\alpha$  are coded 1 and those below  $\alpha$  are coded 0, the image matrix is shown in Table 6. Table 6 was formed from the data in Table 5 after comparison with the overall density of the network ( $\alpha = 0.3667$ ). Details about constructing a network image can be found in Wasserman and Faust (1994).

**Table 4. The Grouping of Elements Among Green Brands.**

Block	Name	Number	Green brand positioning elements	Green brands
A	Manufacturing and eco-performance	8	1. Gas emissions	Toyota, 3M, Siemens, Johnson&
			2. Energy management	Johnson, HP, Volkswagen, Honda, Dell,
			3. Endorsements and regulatory compliance	Cisco, Panasonic, Hyundai, BMW,
			4. Product design	Apple, Danone, L'Oréal, Mercedes-Benz, Nike, Sony, IBM, Ford, Allianz,
			5. Product material	Nokia, Adidas, General Electric,
			6. Partnership	Samsung, Intel, Coca-Cola, Canon,
			7. Innovative technology	PepsiCo, Microsoft, Xerox, Philips,
			8. Recyclability	Shell, Caterpillar, Campbell's, Kellogg's, Avon, SAP, IKEA, Santander, AXA, Starbucks, Nintendo, Credit Suisse, McDonald's, Citi, Barclays, HSBC, UPS, Accenture
B	Product use and advancement and physical environment	3	1. Energy efficiency and value of product use	Toyota, 3M, Siemens, Johnson& Johnson, HP, Volkswagen, Honda,
			2. Smart buildings	Cisco, Panasonic, Hyundai, BMW,
			3. Research and development	Apple, Danone, L'Oréal, Sony, IBM, Ford, Allianz, Nokia, General Electric, Intel, Canon, PepsiCo, Microsoft, Xerox, Philips, Shell, Caterpillar, Campbell's, Avon, IKEA, AXA, Starbucks, Nintendo, McDonald's,

				Barclays, HSBC, UPS
C	Philanthropy and transportation	6	<ol style="list-style-type: none"> <li>1. Commuting of employees</li> <li>2. Transportation</li> <li>3. Biodiversity</li> <li>4. Working condition</li> <li>5. Transport of customers</li> <li>6. Supply chain</li> </ol>	<p>Toyota, 3M, Johnson&amp; Johnson, HP, Honda, Dell, Cisco, Panasonic, BMW, Apple, Danone, L'Oréal, Sony, IBM, Ford, Allianz, Nokia, Adidas, Samsung, Intel,</p> <p>Coca-Cola, Canon, PepsiCo, Microsoft, Xerox, Philips, Shell, Caterpillar, Campbell's, IKEA, Nintendo, McDonald's, Barclays, HSBC, UPS</p>
D	Internal and external communication	5	<ol style="list-style-type: none"> <li>1. External activities of environmental communication</li> <li>2. Providing advice/solutions</li> <li>3. Internal training and education of environment</li> <li>4. Customer orientation</li> <li>5. Encouraging employees to engage in environmental activities</li> </ol>	<p>Toyota, Siemens, Johnson&amp; Johnson, HP, Volkswagen, Honda, Dell, Cisco, Panasonic, Danone, L'Oréal, Mercedes-Benz, Nike, Sony, General Electric, Samsung, Coca-Cola, Canon, PepsiCo, Xerox, Shell, Caterpillar, Campbell's, Kellogg's, SAP, IKEA, Santander, Nintendo, Credit Suisse, McDonald's, Citi, HSBC, UPS</p>

Table 5 reveals that half of the 16 relationships have strong ties ( $\alpha > 0.3667$ ) from block A to A, A to B, B to A, B to B, C to A, C to B, D to A, and D to D. By contrast, weak ties ( $\alpha < 0.3667$ ) are found in the relationships from block B to C, C to C, C to D, and D to B.

Once the image matrix was obtained, the reduced graph was generated from it. In the image matrix, 1 represents the presence of an aggregated linkage of the row position to the column position in the reduced graph, and 0 indicates the absence of such a linkage. The reduced graph was formed from Table 6 and is shown in Figure 1.

As shown in Figure 1, block A received unreciprocated ties from blocks C and D as well as a reciprocated tie from block B. Block B received an unreciprocated tie from block C and a reciprocated tie from block A. Blocks A, B, and D had a high degree of the same green brands within their groups. Specifically, block A played a bridge role among blocks C and D in this relationship network, indicating that blocks C and D had a higher probability of being used as a green brand positioning combination when block A is considered. Relative to the position of blocks A and B, blocks C and D were more peripheral in this network. This indicates that the corporations gave blocks A and B first priority when they considered the combination of green brand positioning elements, whereas blocks C and D were additional or secondary considerations.

**Table 5. Density Matrix.**

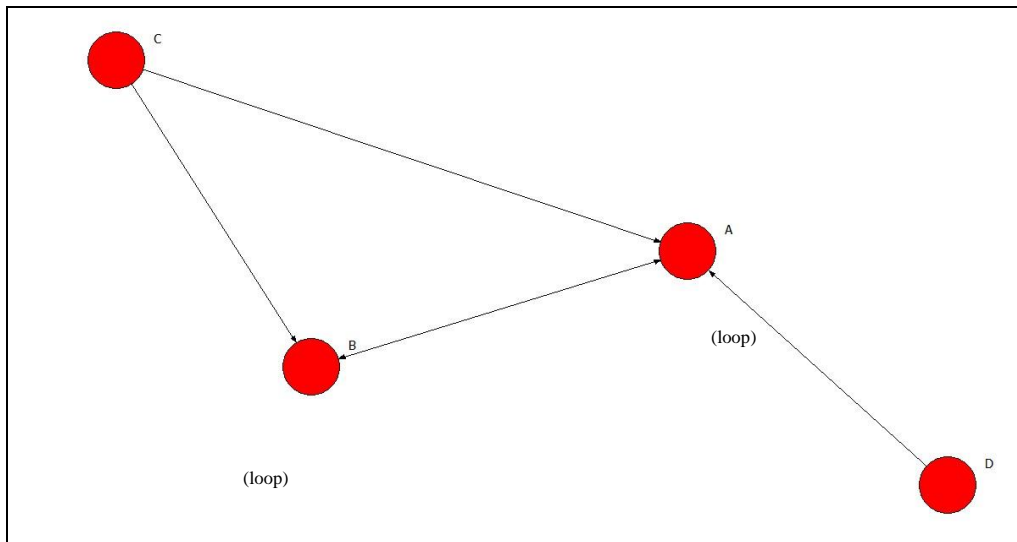
	A	B	C	D
A	0.982	0.542	0	0
B	0.958	0.5	0.056	0
C	0.958	0.778	0.2	0.1
D	0.875	0.133	0	0.4

Note.  $R^2 = 0.705$ . Overall density = 0.3667. Standard deviation = 0.3998.

**Table 6. Image Matrix.**

	A	B	C	D
A	1	1	0	0
B	1	1	0	0
C	1	1	0	0
D	1	0	0	1

$\alpha = 0.3667$  (cutoff value).



**Figure 1. Reduced graph of blocked position.**

(loop)

## Discussion

### *Findings*

This study uncovered 22 elements of green brand positioning and their structural relationships as manifested in corporate websites. The findings are identifiable in the marketing literature regarding brand positioning strategies, which can be further discussed in terms of two aspects: the content of the elements and structural relationships among the elements.

**Content of the elements.** The 22 elements found in this study clearly support research by Hartmann et al. (2005) regarding green brand positioning strategies. Based on Hartmann et al. (2005), green brand positioning strategies are classified as either functional or emotional. Functional strategies build brand associations by delivering information on environmentally sound product attributes, which should be based on relevant environmental advantages of the product compared to competing conventional products such as production processes, product use, and/or product elimination (Meffert & Kirchgeorg, 1998; Peattie, 1995; cited by Hartmann et al., 2005). These attributes of functional positioning are also manifested in this study's blocks of "manufacturing and eco-performance" (A) and "product use and advancement and physical environment" (B). The significance of functional positioning is described in previous research in brand positioning (Aaker & Shansby, 1982; Bridges, Keller, & Sood, 2000; Crawford, 1985; Fuchs & Diamantopoulos, 2010; Keller, 1993; Tybout & Sternthal, 2005; Vriens & Ter Hofstede, 2000).

The emotional positioning strategy is also revealed in this study. The elements found in the blocks "philanthropy and transportation" (C) and "internal and external communication" (D) are similar to a feeling of well-being associated with acting in an altruistic way (Ritov & Kahnemann, 1997) and nature-related benefits stemming from sensations and feelings normally experienced through contact with nature (Kalafatis, Pollard, East, & Tsogas, 1999). The literature on brand positioning has also discussed the emotional/experiential positioning strategy (e.g., Crawford, 1985; Fuchs & Diamantopoulos, 2010; Gutman, 1982; Keller, 1993; Tybout & Sternthal, 2005; Vriens & Ter Hofstede, 2000). This study provides additional support for the importance of these elements in green brand positioning, specifically in the online environment.

**Structural relationships among the elements.** The results of this study also support previous research regarding structural relationships among these elements. According to Hartmann et al. (2005), the emotional positioning strategy has been regarded as an alternative or complementary strategy. Specifically, a green positioning strategy that combines functional attributes with emotional benefits has the most significant results in generating positive brand attitudes. This study's results show a simple core-periphery structure of the green element network. The elements in the blocks of "philanthropy and transportation" (C) and "internal and external communication" (D), which are similar to emotional positioning, are highly dependent on and serve as an additional enhancement for the elements in the blocks similar to functional positioning—namely, "manufacturing and eco-performance" (A) and "product use and advancement and physical environment" (B). This finding is consistent with the combined strategy discussed by Hartmann et al. (2005).



Some researchers (e.g., Aaker, 1996; Kroeber-Riel & Esch, 2004) have noted that functional positioning strategies of branding can have general disadvantages. They can be easily imitated and may reduce the flexibility of brand differentiation. In this study, relative to the position of the blocks similar to emotional positioning strategies (i.e., blocks C and D), the blocks similar to functional positioning strategies (i.e., blocks A and B) were more central to the green element network. In particular, the elements in blocks A and B were found to have the highest values in all three centrality measures. This indicates that they are more frequently used for positioning by several green brands, supporting the argument that functional positioning strategies can be easily imitated.

Overall, the results of this study support the previous research. However, the study also offers perspectives that have not been discussed in earlier research. In this study, the relative importance between individual nodes (i.e., element and block) can be clearly uncovered via a centrality measure and structural equivalence analysis. For example, in the green element network, block A has the most ties with other blocks, followed by B, C, and D. This reveals the relative importance between the four blocks, which cannot be identified via other approaches such as factor analysis and multidimensional scaling.

### ***Theoretical Implications***

This study has several theoretical implications. First, it contributes to the research on green brand positioning in the online context. Although previous studies have identified typologies of brand positioning strategies regarding green branding (Hartmann et al., 2005) and service branding (Blankson & Kalafatis, 2007; Fuchs & Diamantopoulos, 2010; Virtsonis & Harridge-March, 2009), none have explored green brand positioning in the online context. This study's findings complement and extend brand positioning studies that have identified the positioning typologies for green brand contexts and service brand contexts to online green branding contexts. Second, this study serves as a first attempt to advance knowledge on green brand positioning through multiple approaches that integrate content analysis and network analysis. By identifying the elements, typologies, and structural relationships of green brand positioning embedded in corporate websites, the findings of this study offer a network perspective on positioning strategies used by green brands.

### ***Managerial Implications***

This study makes practical contributions by identifying the positioning elements of green branding in the online environment. The findings may help brand and website practitioners devise appropriate positioning strategies while developing a green positioning identity and brand differentiation online.

This study concludes that green brands should look to the positioning elements in the blocks of "manufacturing and eco-performance" and "product use and advancement and physical environment." These elements are more frequently used for positioning by green brands and thus can serve as a reference for brand and website practitioners who are in the initial stages of developing green positioning.

In addition, brand and website practitioners may need to pay attention to the positioning elements in the blocks of “philanthropy and transportation” and “internal and external communication” when devising brand differentiation strategies. This study finds that these elements were additional or secondary considerations in terms of structural position in the element network. Nonetheless, these elements with lower levels of adoption may offer brand managers a useful reference for strategic planning efforts when seeking a proper niche for their brands. Website practitioners also may benefit by creating differentiated positioning images in website design by considering these elements.

### **Contribution**

The contributions of this study are significant to academic researchers and those involved in developing policy and system practices of green branding. First, this study fills the academic gaps by extending brand positioning knowledge to online green branding contexts. Second, this study employs network analysis rather than conventional positioning analysis to investigate the elements of green brand positioning, thereby offering academic researchers a new approach to explore issues about brand positioning and inspect the relationships among positioning elements. Moreover, knowledge of green brand positioning in the online environment should be useful for Web system developers in adopting innovative technologies and interface designs to affect consumer perceptions regarding green brand positioning.

This research has several limitations. First, the findings may not maintain validity across other green brands and online venues. In this study, only 50 green brands and their corporate websites were chosen. The brand positioning elements critical to this study will most likely not remain important for other green brands and online venues. A sample of this size may result in limitations to theoretical generalization. Accordingly, to pursue this other goal, replication with a larger sample size is necessary.

Second, as exploratory research, this study focuses only on an internal analysis of company activities without considering external measures of evaluation. To pursue another verification, future research is suggested to seek empirical support for external evaluation (e.g., consumer attitude, image, favorability) of the elements and their relationship patterns. This may extend the results of this study and provide more insight into this issue.

Furthermore, the study focuses on only two measures of network analysis—centrality measures and structural equivalence—to analyze brand associations. The use of these two measures does not mean that they are the only or best approaches to analyzing and grouping the brands and elements. Other network analysis techniques are available to address the issues of brand positioning, such as cohesion measures and core–periphery structure. These techniques may generate different results and may have other significant implications for brand management.

Finally, with the advancement of Internet technologies, the format and information contained in corporate websites change rapidly. This limitation may be considered in future studies regarding the interpretation of the findings in this study. Longitudinal studies are needed to observe the continuous development of the green branding presence on corporate websites.

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