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Ecological consumer neuroscience for competitive advantage and business or organizational differentiation ☆,☆☆,☆☆☆

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ABSTRACT

The importance of branding in marketing strategies makes it essential to understand the elements that give value-added to the brands. The very nature of ecological brands adds value to them. Knowing the underlying emotions of the elements that add value to brands can justify the benefit of applying neuromarketing to branding. The objective of this study is to justify the use of neuromarketing tools in the ecological branding strategy by analysing the existing literature on branding, ecological branding and neuromarketing. The existing relationship between the elements that give value-added to the brand and the emotional variables that neuromarketing measures, justifies the use of neuromarketing tools in the ecological branding strategy.

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1. Introduction

In recent years, branding or brand management has been considered to be one of the milestones of any marketing and communication strategy due to the high value that brands bring to organizations – both as a differentiator and as a competitive advantage in an increasingly saturated market.

Kotler and Pfoertsch (2010) define branding as “the discipline that deals with the creation and management of brands through the strategic management of a whole set of assets linked (directly and indirectly) to the name and/or symbol that identify it, while influencing the value both for the ones offering and the ones being offered.” (Boix, 2017, p. 177).

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It should be seen as one of the main components of marketing strategy (Douglas et al., 2001, p. 97). Saavedra (2004, pp. 523–524) mentions the main elements contributing to brand value, such as notoriety, brand image, perceived quality and loyalty. Brand quality, whether real or not, is a subjective term (perceived quality) that is marked by the consumer's attitude towards the brand (Boix, 2017, p. 144).

The perception of the corporate social responsibility (CSR) of a company by the consumer leads to an increase in its brand value (Lai et al., 2010, p. 466). More specifically, corporate environmental responsibility is considered an element contributing to brand value (First & Khatriwal, 2010), as well as a source of competitive advantage (Chen & Chai, 2010; Lee et al., 2014, p. 512).

An important source of this brand value is the Corporate Social Responsibility (CSR) perceived by the consumer, which includes the positive association between the brand and the organization, the improvement of the perceived quality, building brand loyalty and leading to brand satisfaction (Lai et al., 2010, p. 457). Therefore, understanding the effect that different elements supporting brand value have on consumer behaviour seems essential for branding strategy development.

All the intangible brand aspects mentioned above (brand image, notoriety, loyalty, perceived quality or CSR) that comprise its value

are related to emotional dimensions (Mudambi et al., 1997, p. 438).

The emotions generated by brands have a strong influence on how consumers process messages and understand and model their cognitive response to the stimuli (Morin, 2011, pp. 132–133). However, a great number of subconscious elements in these cognitive processes show limitations of traditional market research methodologies. To overcome these limitations, “the application of neuroscientific methods to analyze and understand human behaviour related to markets and marketing” is introduced (Lee et al., 2007, p. 200), where we come to the definition of “neuromarketing”.

With the use of technological equipment, neuromarketing allows the recording and measuring of brain activity and psychophysiological variables associated with different emotional states that occur when a subject is exposed to a stimulus, which are related with its attention and memorization, analysing the two emotional dimensions: arousal and valence (González-Morales, 2018, pp. 9–10).

The objective of this project is to expose and scientifically confirm the possibility of developing and managing branding strategy by using neuromarketing techniques. Specifically, we are referring here to branding in a market with unique characteristics such as the organic market and the ecological brand. The hypothesis advocated is that through neuromarketing it could be possible to study aspects related to ecological brands that could help to improve their value.

2. Materials and methodology

For the purpose of this study, an extensive review of the literature has been carried out, in which more than 250 articles have been searched under the terms of “branding”, “ecological brand”, “green marketing”, “neurobranding” and “neuromarketing”.

This work has been carried out through cross-sectional exploratory research with a qualitative approach, through which the contributions of different authors have been analyzed, with the proposal of providing appropriate scientific theoretical support to each section of this article.

The methodological process has been carried out in the following three phases:

- a. Preparation, in which the scientific basis was investigated.
- b. Fieldwork, consisting of research into neuromarketing, ecological neuromarketing, neurobranding studies carried out in the last five years and of branding, brands and ecological marketing, in a wider period.
- c. Content analysis, selection/organization of information and description of the results of the paper found in the second phase.

In the preparatory phase, the author’s previous knowledge in the fields of neurosciences, consumer psycho-sociology, marketing and communication has been taken as a basis. Also, the object of the project has been determined defining, in addition, the orientation of the contents that should support the conceptual theoretical framework from which the research starts, which have been proposed to state the different sections of the theoretical framework.

The fieldwork has consisted of an intense search for scientific articles through the Google Scholar search engine and through the search engine of the University of Seville library.

This has direct access to different databases to which said entity is subscribed; Scopus, Dialnet, Science Direct, Scimago Journal & Country Rank, Journal Citation Reports and other internationally relevant databases.

The following word sets have been used as search words without quotes: “branding”, “ecological branding”, “ecological neuromarketing”, “ecological neuromarketing branding” and their Spanish-language counterparts.

The articles found which were directly related to the theme of this article have been compiled, without taking into account the level of impact of the different journals in which they have been published, so we have had knowledge of journals positioned Q1, Q2, etc. Also, it has been considered necessary to include some doctoral theses, approved by universities of recognized prestige, with exhaustive and interesting content for this article.

At this point in the writing of the article, it is considered essential to offer clarifications, in case any doubt arises. It is not an exhaustive bibliographic review of the articles referred to as a question of study, nor a summary or review of the knowledge that each of the researchers cited have contributed to science, but an investigation that provides an answer to the question posed.

Subsequently, an analysis of the content of more than 250 selected works was carried out, from which much knowledge was obtained about branding, ecological branding, ecological neuromarketing, neurosciences, etc.

Sixty-one references have been selected for their importance and suitability for creation of the theoretical basis of this article, according to the author’s own criteria, and have been cited in the references section.

During this search, no article was found which assesses the suitability of the use of neuromarketing as a tool to evaluate ecological brands, nor has any similar work been located.

We have also analyzed and used the knowledge of the field of neurosciences, which the author had previously obtained and which is part of the unpublished doctoral thesis in neuromarketing carried out by himself, under the title “Measurement of the effectiveness of images in communication. Study of brain waves and peripheral psychophysiological meters” at the University of Seville.

The knowledge, which has been considered important for the conformation of the theoretical body of this article, has been selected and grouped, taking into account the section of the theoretical revision to which it was going to give foundation. Subsequently it has been organized in such a way that it would give rise to a text to develop the theoretical body in an orderly manner.

3. Results

3.1. Branding

This discipline handles everything to do with the brand, from its creation to its management. Closely related to the brand are the concepts of brand value: the added brand value for the company and the market (Keller & Lehmann, 2007, p. 740); and brand value from the consumer’s perspective—its equity (Buil, Martínez, & de Chernatony, 2010, p. 169). In other words, the value-added that the brand provides is analyzed from a double perspective: the value that the brand provides to the organization (brand value) and the importance that the brand itself has for the consumer (brand equity).

Existing literature suggests that there are five elements which are key in the contribution to brand value and equity: brand awareness, brand image, perceived quality of the brand, brand loyalty and other assets of the brand, such as the perception of the organization (Saavedra, 2004, pp. 523–524).

Brand awareness is defined by familiarity with the brand and its prominence (Boix, 2017, p. 129). The fundamental element is the familiarity with the brand, which could be defined through two variables: the recall and the recommendation of the brand (Keller, 1993, p. 3). That is, the brand's reputation is closely related to the consumer's response to the stimuli, brand memorization and associations between the brand and its graphic elements and possible use scenarios.

Brand image is composed of the following elements: brand associations, brand performance over time, consumers' perception of the brand, brand differentiation, brand personality, organization behind the brand and brand reputation (Boix, 2017, p. 136). That is, the brand image is closely related to the associations that the consumer makes between the brand and the product, the perceived benefits (functional or emotional), its own personality, values, philosophy or the relationship it has with the organization. Once again, this attribute of brand equity value depends on the associations of the consumers with the brand and the feelings that it evokes in them.

Brand loyalty, considered as brand resonance, is the strength of the relationship that consumers have with the brand and the level of activity that it generates (Keller, 1993, pp. 4–7).

3.1.1. Green marketing or ecological branding

By understanding Green Marketing as a category of Social Marketing (Lee et al., 2014, p. 513), the brand value that CSR provides can be extrapolated to the one that contributes to the Corporate Environmental Responsibility (CMR) through the Ecological Brand.

Environmental attitudes of consumers are closely related to the brand value. Allport (1935) defines the attitude as “a state of predisposition that is learned to respond favourably or unfavourably to an object or situation.” Among these ecological attitudes, we can highlight the ecological conscience, cognitive variable of the environmental attitude that is based on ecological knowledge, and belief that is increased by remembering and increasing information of the product and the ecological brand (Calomarde, 2000, pp. 11–12). However, a gap has been noted between the consumer's ecological attitude stated via traditional means of self-evaluation, and his pro-environmental behaviour of purchasing ecological brands (Young, Hwang, McDonald, & Oates, 2010, p. 20).

Neuromarketing, as will be exposed in the following sections, can be crucial to the development of ecological brands, in a sector in which traditional methods cannot provide a solution to or understanding of the gap between the ecological conscience of the consumer and its pro-environmental behaviour (Kollmuss & Agyeman, 2002, p. 239).

3.2. Neuromarketing

3.2.1. Neuromarketing scientific base

As has been mentioned in the introduction to this paper, brand image, notoriety, loyalty, perceived quality or CSR define their values in relation to emotional dimensions.

“There are authors who define emotion within two dimensions [...]: one is valence, which goes from pleasant to unpleasant, and the other is arousal or activation, which ranges from excited to calm” (Moltó et al., 1999, p. 57). To know if it is possible, the evaluation of these two dimensions of the emotions is very important; to confirm that this evaluation is possible is one of the objectives

of this article. “Regarding arousal, the researcher Montano et al. (2009) has shown that through heart rate (HR) and galvanic skin response (GSR) it is possible to assess the state of emotional arousal of the subjects” (González-Morales, 2018, p. 33).

“At the same time, Dolcos, LaBar, and Cabeza (2004) have shown that valence is related to certain patterns of brain activity, so by understanding and measuring this pattern, the valence could be defined” (González-Morales, 2018, p. 36).

Dolcos et al. (2004) showed the importance of understanding emotional dimensions (arousal and valence) in the processes of stimuli evaluation, memorization, and cognitive processing (González-Morales, 2018, p. 35).

These emotions are closely related to the consumer's subconscious brain activity (Katarzyna, 2014, p. 12). To understand that the emotions influence the subconscious brain activity of the consumer is another step towards the objective of this article and demonstrates the potential of the use of neurosciences in brand strategy development, through what has come to be called “Neuromarketing”. The Spanish Association of Neuromarketing and Neurocommunication AENENE defines Neuromarketing as “the application of neurosciences in order to facilitate and improve the creation, communication and exchange of actions, services and products of value among groups and individuals who need and want to satisfy their needs through these exchanges” (González-Morales, 2016).

The application of neuroscience to marketing is primarily based on Damasio's Theory of somatic markers (Damasio et al., 1996, pp. 1413–1414), which defines emotion as a change in physical state (a somatic marker). These markers influence the response to a stimulus, both consciously and subconsciously. According to the author, these physiological changes can be perceptible or only visible in brain activity, and influence human reasoning and decision-making. The decisions of people are related to the somatic marker, and the somatic markers are directly related to emotions, a new step towards the goal of this article. These somatic markers are the variables that are measured in neuromarketing to evaluate the efficiency of marketing stimuli.

They depend on previous individual experiences or associations, processes closely related to learning, attention and both working and long-term memory.

Working memory, defined by Baddeley (1992) “is the ability to retain transcendental information in the mental space, with the expectation that this information will be used to guide behaviour in the near future” (Lee et al., 2014, p. 514). A stimulus, when noted and perceived, is transferred to this work memory, which has a double function: storing short-term information to retain them, compare them, contrast them or relate them to each other; and at the same time, manipulate the necessary information for complex cognitive processes (Etchepareborda & Abad-Mas, 2005, p. 580), acting as a link between attention and long-term memory.

In the introduction, we have shown that with technological equipment, neuromarketing allows the recording and measuring of brain activity, and psychophysiological variables associated with different emotional states that occur when a subject is exposed to a stimulus.

With this information, it is possible to study the attention and memorization, analysing the two emotional dimensions: arousal and valence).

3.2.2. Neuromarketing technology

There are several types of equipment that can be used in neuro-marketing technology. Among these, it is worth highlighting those that, due to their characteristics or their ability to measure the emotional dimensions (valence and arousal) have been used to measure fundamental elements when creating and managing a

brand. These are Functional Magnetic Resonance (fMRI), Electroencephalography (EEG) and Peripheral Biometric Metrics (GSR, HR, etc.).

3.2.2.1. Functional magnetic resonance (fMRI). This is able to locate active areas in the brain and makes it possible to compare images of patterns of brain activity when a specific function is being performed, or to understand the areas that are activated during a specific function performance (Wilson et al., 2008, p. 391). Functional Magnetic Resonance, being able to measure brain activation, and different patterns related to the emotional valence (González-Morales, 2018, p. 36), allows us to measure the emotional valence (pleasant or unpleasant) provoked by a stimulus; another step in the goal of this article.

For all these reasons, and despite its high cost, it is the predominant tool in the neuroscientific field, providing great scientific insights into the function of the brain (Morin, 2011, p. 134).

3.2.2.2. Electroencephalography (EEG). Various studies have shown a greater involvement of the regions of different hemispheres depending on whether the experience is positive or negative (Davidson et al., 1990, p. 331).

“These studies suggest that a greater relative activation in the frontal regions of the left lobe are associated with positive emotional states or higher levels of motivation towards an element” (Arieli & Berns, 2010, p. 7).

Electroencephalography could be an ideal tool for measuring emotional valence, a fundamental aspect in the evaluation of emotions and in the efficiency of ecological brands; another step towards the goal of this article.

3.2.2.3. Peripheral biometric metrics. This tool focuses on the analysis of the information provided by the Peripheral Nervous System (PNS), which is related to involuntary human responses, associated with emotional response, activation or arousal (Viejo et al., 2018, p. 2).

Among these peripheral variables, we can highlight the heart rate (HR) and the galvanic skin response (GSR). The measurement of the conductivity of the skin through GSR is associated with attention, cognition and emotional arousal (Vecchiato et al., 2010, p. 166).

“Through GSR and HR metrics it is possible to evaluate the “internal” emotional state of the subject when measuring the autonomic system activities. The GSR is considered a sensitive and convenient measure of sympathetic activation changes associated with emotion, cognition and attention. With functional imaging techniques, it is possible to analyze the relationship between the level of electrodermal activity, ventromedial prefrontal cortex, orbitofrontal cortex, the left zone of the motor cortex and the anterior and posterior cingulate cortex. These areas are associated with emotional and motivational behaviours, which show the existing relationship between peripheral and brain measurements, re-emphasizing the close relationship between electro dermal activity, excitation, attention, cognition and emotion (Crichley, 2002)”, quoted in González-Morales (2018). This is a new step on the way to the objective of this article.

3.2.3. Similar applications

Using fMRI Hillenbrand et al. (2013, p. 300) has analyzed consumer preferences for certain types of brand names. He did this by exploring different types of brand names (brands that mention functional benefits via text, brands as a result of morphological combinations that suggest the product's benefits, names without relation to the expected benefits or a morphological combination without reference to the benefits). During a brain scan, a greater

cerebral activation with the names related to the expected benefits of the brand was noted. In addition, among these suggestive names, greater activation was observed in brain areas related to emotional processing for brand names that represented morphological combinations suggesting the expected benefits.

Plassmann et al. (2012, p. 6) collects different neuroscientific studies that have been performed using fMRI related to different areas of branding.

Relating to favourable brand associations, this includes research as diverse as: the analysis of brain regions that are activated when a favourite brand is chosen and when a brand is chosen without preferences (Deppe et al., 2005).

Brain activity as an indicator if the consumer is influenced by the brand when assessing credibility (Kenning et al., 2005) and the appeal of print advertisement (Deppe et al., 2007); the role of the ventromedial prefrontal cortex in the processing of information provided by the brand (Koenigs & Tranel, 2007) or the greater cerebral activation provoked by preferred brands during highly uncertain decision-making processes (Plassmann et al., 2008).

Studies related to different types of brand associations that have been collected also show great diversity. Among others, they show whether the brain areas related to reward processing performed greater cerebral activation when the subject was presented with brands/products implying high social status (Erk et al., 2002). Also subject to investigation were the brain regions with greater activity before exposure to car brands with higher and lower social status implications (Schaefer & Rotte, 2007). Furthermore, the non-correlation between neuronal activity that occurs when a person judges another person with the one that occurs when judging a brand (Yoon et al., 2006) or the famous Coca-Cola vs. Pepsi experiment in which neuronal changes occur in certain brain regions (related to memory and association) when changing from a “blind tasting” to the one where brands are known (McClure et al., 2004).

With respect to the memorization of the brand, we have collected research that studies the correlation between brain activation changes for known and unknown brands (Schaefer et al., 2006) or the relationship between memory and preference, focusing on the influence of brand association (Klucharev et al., 2008).

Finally, related to brand loyalty, we have found research on the brain activations of loyal and disloyal consumers when choosing a brand (Plassmann et al., 2007).

A prominent technique in Neuromarketing is the model of brain asymmetry via Electroencephalography (EEG). As reported by Bosshard et al. (2016, p. 4), the model shows that greater activation in the left frontal hemisphere is associated with positive emotions, whereas greater activation in the right side is associated with negative emotions. This has been demonstrated by studies in different market and consumer contexts (Brown & Randolph, 2010, 2012; Ravaja et al., 2013; Solnais et al., 2013).

Brown and Randolph (2012, pp. 7–9) analyzed the differences between subjective responses and brain activation of consumers (using the brain asymmetry model) in relation to different brands of beverages. The author concluded that the subjective response to some brands was preferable, but for these selected brands no greater brain activity was noted, which would mean that these brands were “processed” as neutral. Consumers who perceived these brands as neutral were more willing to change brands later.

Using EEG, other authors have analyzed the cerebral response associated with the empathic response towards products associated with emblematic social causes (Lee, 2016, p. 3751). This study showed consumers a social product and a conventional product of the same category while measuring was done by EEG. Greater amplitude was seen in Theta waves, related to sensitivity to emotional experiences (Aftanas & Golosheikine, 2001, pp. 57–60) for socially responsible products.

This greater activation in these waves also occurred for consumers with ecological orientation in response to stimuli from “eco-friendly” products in another study (Lee et al., 2014, pp. 517–518). These types of waves have been related to working memory (Summerfield & Mangels, 2005, p. 692), associated with the encoding of stimulus information.

With respect to ecological messages, experiments have also been conducted to identify the neuronal response to them. Casado-Aranda et al. (2018, p. 669), through the use of fMRI analyzed the cerebral response to ecological messages and the relationship between these and the behavioural response. He came to the conclusion that activation was greater for optimistic messages which were referring to future situations.

Ma et al. (2008, pp. 610–611) investigated whether there was a greater amplitude in the P300 which evoked potential for products that were brand extensions. The author demonstrated how a higher P300 was noted for this type of product when there was consumer association of the original brand’s benefits with that product extension. He also discovered a greater amplitude in the potential of N270 when there was a conflict between brand name and product category (Ma et al., 2007, pp. 1033–1034).

In line with this, Jin et al. (2015, p. 572), investigated brain responses to different branding strategies (brand extension or new brands creation) using the evoked potentials. The author reflected that the acceptance of a product depended on the association between the brand name and the name of the product, with the potential N400 being an indicator of this.

Fudali-Czyz et al. (2016, p. 30) studied the brand extension process for consumers who spoke a language with European origin. The results of the study showed that potentials N270, P300 and N400 were sensitive to inconsistencies between the product category and the previously presented brand.

Several authors have investigated brand extension to other products using evoked potentials. Most have investigated different cognitive processes in perceiving brand extension, such as the analysis of conflict between physical attributes and lexical content reflected in ERP N2 (N270) (Ma et al., 2007), in the process of categorization taking into account P300 (Ma et al., 2008) and N400 (Wang et al., 2012). The results obtained also suggest the possibility of using this method to evaluate the extension of brand among services (Yang, Lee, Seomoon, & Kim, 2018, p. 2).

4. Discussion

This research allows us to state that neuromarketing has been used in the evaluation of different issues related to emotional activation and the congruence of brands. Specifically, in matters related to different elements that enhance the value of the brand such as notoriety, brand image, perceived quality or loyalty, which are closely related to the emotional dimensions they generate (valence and arousal).

Via functional magnetic resonance Hillenbrand et al. (2013, p. 300) noted greater brain activation with the names related to the expected benefits of the brand and for brand names that represented morphological combinations suggesting the expected benefits. Plassmann et al. (2012, p. 6) present studies from different authors using fMRI related to different branding aspects.

Research on ecological products has also been carried out in order to identify neuronal response to them. Casado-Aranda et al. (2018, p. 669) analyzed the cerebral response to ecological messages and the relationship between these and the behavioural response.

Via electroencephalography, Bosshard et al. (2016, p. 4) analyzed the asymmetry associated with positive and negative

emotions, which has also been demonstrated by studies in different market and consumer contexts (Brown & Randolph, 2012; Ravaja et al., 2013; Solnais et al., 2013).

Brown and Randolph (2012, pp. 7–9) analyzed the differences between subjective responses and brain activation of consumers (using the brain asymmetry model) in relation to different brands of beverages. Lee (2016, p. 3751) analyzed cerebral response associated with the empathic response towards products associated with emblematic social causes. There are many studies that reveal the possibility to investigate cerebral activity when a subject is exposed to socially responsible stimulus (Aftanas & Golocheikine, 2001, pp. 57–60; Lee et al., 2014, pp. 517–518; Ma et al., 2007, pp. 1033–1034; Jin et al., 2015, p. 572; Fudali-Czyz et al., 2016, p. 30; Yang et al., 2018, p. 2).

By using peripheral biometric measures, the peripheral involuntary physiological responses associated with emotional response, activation or arousal in different surroundings, including commercial ones, have been studied (Viejo et al., 2018, p. 2; Vecchiato et al., 2010, p. 166).

5. Conclusions

The authors highlight the importance of branding today, while confirming the relationship between the different perceived aspects of a brand and the cognitive processing that the target audience carries out with their decisions. As they confirm, this cognitive processing and the elements that add value to the brand vary depending on the emotional states that the brand generates.

On the other hand, they also confirm that emotional states can be studied through neurosciences, it being possible to evaluate the elements that add value to brands and assist in branding strategies. They have proposed that the emotions that these elements generate, and how these emotions influence cognitive processing are tightly linked.

Subconsciousness is of great importance in these cognitive processes and of the emotional dimensions (valence and arousal) in the processes of stimuli memorization, evaluation and processing. The buying decisions depend on these actions. Therefore, this knowledge is vital to the success of the companies. To understand the emotions caused by brands, products, advertising etc., it is possible to use neuromarketing, as has been demonstrated during this article.

On the other hand, the authors confirm that there is a difference in cognitive processing of organic and non-ecological products, and that this difference causes activations that can be studied via neuromarketing tools. It has been argued that a strategy of corporate environmental responsibility is considered an element that adds value to the brand and is a source of competitive advantage.

We can conclude by saying that neuromarketing is a discipline that provides ecological branding with very important instruments in order to evaluate the elements that add value to brands. After this conclusion, in the future we consider it necessary to continue research into new applications of neuroscience to business, to improve the efficiency of this business by means of different related fields: marketing, publicity, personal recruitment or business management in general. We will be working in that direction in order to improve technical decisions in business.

Author contributions

Antonio González-Morales has directed this work, he has made contributions and he has adapted the work to the recommendations of the editorial.

Jelena Mitrovic has done the traduction to English Language.

Rafael Ceballos Garcia has performed the work operationally.

Conflict of interest

None.

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