



Development of a brand value measurement model with a corporate social responsibility perspective. A comparative analysis of consumer perception of energy providers in Spain and Colombia

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ABSTRACT

Sustainable development of companies and their products involves the integration of multiple dimensions, including economic, ethical, social, and environmental considerations, all of which are increasingly important to consumers. The present study identified key variables that define brand value in the context of Corporate Social-Environmental Responsibility (CSR), comparing two companies in the energy sector in Spain and Colombia (Naturgy and Ecopetrol S.A.). Among the factors that contribute to brand success, this study evaluated three variables: Visibility, Loyalty and Experience as perceived by consumers. Data measuring brand value were collected through an online survey of 640 respondents in Spain and Colombia, assessing their response to company logos and corporate messaging regarding environmental sustainability of their operations. Structural equation models (SEM) were then used to measure brand value based on latent variables and compared to survey data. Our results show that company visibility had a positive impact on brand loyalty and consumer experience, which ultimately increases brand value. Conversely, an improved consumer experience can also enhance brand loyalty and visibility. Our findings represent a framework to quantify brand value within the energy sector that is based on integrating multiple indicators of brand equity (BE) using the analysis of company logos, while simultaneously considering CSR, greenwashing and other forms of company messaging. This integration is a significant departure from traditional approaches and offers a new and novel perspective when developing a comprehensive corporate model. Our study suggests that implicit and explicit allusion to corporate environmental-social responsibility has a profound influence on brand recognition and brand acceptance by customers, due to the positive responses it elicits. The current study's findings support incorporating references to CSR in sustainable branding in its broadest spectrum and definition and offer a procedure to quantify and measure brand value, which can help company managers make effective branding decisions.

1. Introduction

Consumption has an intrinsic meaning of what is acquired, the ostentation of consumption, materialism as a value, consumer behavior and self-image, consumer identity, what social influence means in buying an object, and the need to have approval and social support through consumption. According to Maslow and his «Theory of Human Needs», our needs are distributed in a pyramid, depending on their importance and influence on human behavior (Maslow, 2013). At the

pyramid's base are the most elementary and recurrent needs (called primary needs), while at the top are the most sophisticated and abstract (secondary needs). Nevertheless, in recent decades consumption has exceeded what is strictly necessary for survival, resulting in a society that is driven by the production and acquisition of goods and services that are often superfluous. This trend has led to the depletion of natural resources and growing ecological imbalances. Consequently, consumers are increasingly calling on companies to become more sustainable and to openly express their commitment to social, environmental, and

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economic sustainability (Edwards, 2024; Vuong & Bui, 2024). Companies that fail to address these concerns risk losing the trust and loyalty of their customers, which can have a detrimental impact on their competitiveness and profitability.

But it is worth noting that the most pristine conception of sustainable development arose in the thirties from the formulation of mathematical and statistical models, to establish the limits of the use of natural resources, protection of the environment, which served as the basis for the publication in 1987 of the report of the Brundtland Commission «Our Common Future». That demanded a new model of global economic development (Brundtland Report, 1987). With this new paradigm in place, advertising and marketing in the seventies very timidly assumed the concept of sustainability as a complement to their activities (Winit and Kantabutra, 2017, 2022).

As a result, the concept of sustainable branding (SB) arises, which consists of integrating environmental, economic and social aspects into the operation, culture and communication of a business (Belz and Peattie, 2009; Idowu et al., 2020). It arose and is current due to the social need to address global concerns, so more and more customers are waiting for brands to position themselves and defend these interests. The success of an SB strategy lies in the fact that the company is really sustainable, and not just that it seems so, before which there is simply a manifestation of greenwashing. As a general conduct, society agrees or strongly agrees that brands have a responsibility to protect people and the planet through sustainable initiatives, and is willing to support and turn off more sustainable, green or eco-friendly products (Yildirim et al., 2024). Building a brand that is profitable, socially and ecologically conscious, and long-term focused on reducing negative effects and maximizing positive results for all stakeholders—including the environment—is the aim of SB. It is very clear that more and more people in more and more countries feel unable to admire or respect countries or governments that pollute the planet, practice or permit corruption, trample human rights or flout the rule of law. This implies that a company's product management, its technological, environmental and social awareness, as well as its risk management, must align with public sentiment and greater political objectives, such as the Sustainable Development Goals (SDGs) (Sander et al., 2021; United Nations, 2024). This new current consumer awareness urges companies to adopt increasingly «green» attitudes and messaging, be they real or perceived. In other words, for brands to have a roadmap that incorporates sustainability and that is guided by an ethical framework, they benefit from implementing actions (or, projecting an image) that conveys commitment to environmental responsibility, as this enhances customer acceptance and reduces potential risks to their reputation, regulation or operational stability.

To achieve BS and ensure continued brand persistence and relevance, it is recommended that brands continually refresh their identity. This involves, among other actions, reassessing branding goals and strategies frequently and updating messaging, while considering changing environmental circumstances, consumer feedback and expectations and making appropriate adjustments, not out of obligation but, rather, out of conviction. Sustainable branding ultimately results in a marketing strategy that repositions a company or its brand on a path towards becoming more environmentally sustainable, commercially fair, and socially responsible (Mark and Pearson, 2001; Holt, 2004; Gobé, 2005; Bevan and Wengrow, 2016). Sustainable branding thereby complements other types of branding, such as «cultural branding», «emotional branding», and «branding and religion» (Einstein, 2011; Bohle and Marone, 2021; Górska-Warsewicz et al., 2021; Nguyen-Viet et al., 2024).

In accordance with Lury (2004) brands are deemed to be an «object» with a deep-rooted presence in various social groups that function as a means for propagating cultural values. As a result, advertising campaigns aim to maintain and grow brand recognition and appeal. This has led to extensive research on the concept of brand equity (BE) from both financial and marketing viewpoints (Papadopoulou et al., 2023;

Gálvez-Sánchez et al., 2024). BE, also known as *brand value* or *brand capital*, refers to the set of features, qualities, and obligations that are linked to a brand's name, logo, emblem or symbol, including customer loyalty, recognition, and mental association, which collectively contribute to the value of a product or service (Aaker, 1996; Becchetti et al., 2020; Bernato et al., 2023; De Vasconcellos-Rocha, 2024; Ho et al., 2024; Liang et al., 2024).

In addition to consumers, investors also require a clear understanding of the value of the company they acquire, to guide strategies and the allocation of resources that increase brand value. This leads to a marketing approach that aims to positively influence consumer and investor brand perception and enhance a company's appeal to them (Manzano et al., 2013; Rossel, 2016; Azzari and Pelissari, 2020; Shrestha et al., 2023). Brands have a range of options to communicate the specific image or symbolism they wish to convey. Researchers argue that today's consumers are increasingly willing to pay for products that project meaning or symbolic value beyond their functional attributes (Atkin, 2008; Molina and Morán, 2013). As a result, it has become essential for brands to convey attributes, benefits, and services that evoke a sense of environmental and social responsibility, including quality assurance certificates (Wilensky, 2006; Aldás et al., 2013). Branding, thus, can significantly enhance the perceived value of a product or service, and even suggest attributes that may not be present.

The importance of brand valuation lies in the interaction of the parties in the market, the offering agent, and the consumer; this evaluation impacts economics, satisfaction, and quality benefits, among others. Therefore, it is the function of companies to measure the value of a brand, to know the perspective of consumers in front of the product to be acquired, and thus manage the development of the brand. *Brand value* is defined as the differential effect that the knowledge of the name of a brand has on the consumer's response to the actions of marketing.

There are multiple variables used to apply, evaluate and propose pragmatic models that allow the evaluation of BE, trying to overcome the theoretical approaches that have been the common denominator of most models. The common denominator among these proposals are seemingly intangible attributes such as attachment, loyalty, quality and brand perception that consumers associate when exposed to promotional activities or any other brand-related activity (Rivera, 2015; Oliveira et al., 2023; Troiville, 2024). Given the complexity of variables, it is practical to apply «General Systems Theory», an interdisciplinary tool that is also employed in advertising research. Starting from the fact that companies and their brands function as a semiotic system, marketing and advertising communications are closely related to semiotics, and this plays an important role in the success or failure of any effort, so it includes among its suggestive strategies, both oral and non-verbal, to approach the target audience and modify their attitudes, behaviors, lifestyles, values, the SB and the CSR dimensions and interactions (Faizan, 2019; Ricciardone and Danesi, 2023; Danesi, 2024).

However, CSR is far from new and, contrary to what has been suggested by various authors (Accinelli and De la Fuente, 2013; Foxe, 2014; Royo, 2020; Barrio-Fraile and Enrique-Jiménez, 2021; García et al., 2021; Velte, 2021) did not emerge recently or in the last century. In fact, the roots to CSR can be traced back to Aristotelian philosophy, which defines humans as social beings with responsibilities and a need for a social ethic (Aristote, 1983, 1992). Past research on CSR proposes two theories regarding the role of consumers: the pyramid model, which considers the economic, legal, ethical, and discretionary aspects that companies implement (Carroll, 1979) and the notion of associated corporations, proposed by Brown & Dacin (1997) which deals with the economic and non-economic aspects of CSR (Mohr and Webb, 2005; Alvarado-Herrera et al., 2011). Both approaches emphasize logic, judgment, and economic-strategic rationality in brand positioning, which ultimately contributes to «corporate citizenship». And both scenarios consider the contributions that companies make to society, such as social investment, philanthropic programs, and compliance with government and public expectations.

Regardless of its social, economic, or political importance, CSR is not a compulsory act, but rather a voluntary one that a company chooses to make, encompassing diverse legal, ethical, moral, and environmental commitments, all of which are related to its operations and its interactions with employees, shareholders, partners, suppliers, and the broader community (Lång and Ivanova-Gone, 2019; Muniz et al., 2019).

The present study aimed to identify crucial factors determining brand value, focusing on three key variables: Visibility, Loyalty, and Experience, as customers perceive. These variables were combined to develop an empirically testable conceptual model that measures brand value concerning perceived CSR. Additionally, we examined whether consumers perceive CSR as an inherent or acquired organizational value and whether other factors are at play (Wickert et al., 2016). When assessing BE, it is also important to consider whether a company's actions are consistent with its messaging, or *responsible communication* (RC), in essence comparing what a company says with what it does. Unfortunately, branding without true CSR can often lead to «greenwashing», where products, services, and economic activities are portrayed as being sustainable when, in fact, they are not (Hallama et al., 2011; Bruno, 2012; Alejos, 2013; Uyar et al., 2020; Gutiérrez, 2021). Lippert (2011) identifies four types of greenwashing: (i) products that are advertised as environmentally friendly (but might not be), (ii) processes that claim to reduce environmental impact (but might be ineffective), (iii) emblems or logos that claim ecological sustainability through symbolic association (real or perceived), and (iv) structures that claim to be environmentally friendly (but might not be so).

A company's transition towards a more ecological (or «eco») image can be evaluated via the semiotic analysis of old and new logo symbols and the accompanying company messaging, taking into account the «representamen» (the sign), the «interpretant» (the way the object or symbol is perceived by the target person), and the objectives of the logo symbol, considering its dynamic objective (OD) and its immediate objective (OI) (Peirce and Vericat, 1988). Our study represents a pragmatic framework that combines the analysis of indicators of brand value and CSR using structural equation models (SEM) and the semiotic analysis of logo symbols, while simultaneously examining company messaging for evidence of greenwashing.

The universe of multiple aspects related to corporations and their brands go through authenticity evaluations quantitative or qualitative. These environmental, economic, ethical, social, and CSR evaluations lead environmental awareness inquiries into consumers, like social and environmental dimensions in the generation of BE, ethical environment, brand philanthropy, corporate reputation, brand loyalty, brand attitude, brand authenticity, sensory brand experience, the impact of poor corporate social responsibility engagement signalled through negative environmental and social incidents, green brand image, corporative sustainable development, dimensions of consumer perceived brand transparency, brand activism, corporate sociopolitical activism, corporate social advocacy, brand communications, brand authenticity, corporative sustainable development, brand preference, firm's reputational risk exposure, firm's regulatory risk exposure, satisfaction of the employees and corporate credibility, and recently, digital orientation has a marked influence on brand competitiveness (Manjunath et al., 2024), and the potential associations between CEO overconfidence, customer satisfaction, and brand value (Sharpe et al., 2023). The influence of the variables that are estimated through theoretical or pragmatic models with mathematical and statistical applications, which generates a reasonable degree of certainty for brand management and marketing.

Of the research and models presented in Table 1, six are qualitative, as are those that combine qualitative and quantitative, and 12 are quantitative and use, among others, the variables listed to quantify or qualify their influence on BE, through the behavior and response of consumers, retailers or stakeholders. Two studies apply financial variables in their models: (i) Febra et al. (2023) thinking that corporate reputation has deserved attention in recent years from firms and researchers given its impact on creating a competitive advantage and on

keeping a sustained superior performance, and (ii) Rudkowski (2024) proposes that the IRBE - Integrated Retailer Brand model, when operationalized, can encourage closer integration of human resources and marketing functions and enable practitioners to enhance their brand offerings and build a more cohesive retailer brand. Saracevic & Schlegelmilch (2024) determine how brand activism has attracted substantial attention due to the consumer's rising demand for brands. Mukherjee & Althuizen (2020) answer the question: how do consumers react when brands take a stand on controversial socio-political issues?

The CSR appears in six research (Gálvez-Sánchez et al., 2024; Ho et al., 2024; Nguyen-Viet et al., 2024; Saracevic and Schlegelmilch, 2024; Vuon and Bui, 2023; Hydock et al., 2020). They emphasize that CSR efforts help the environment and affirm the moral values of universalism and benevolence

Seven models assume among the variables studied with respect to BE and the environment: (i), the social and environmental dimensions in the generation of BE (Gálvez-Sánchez et al., 2024); (ii) the impact of negative environmental and social actions (Ho et al., 2024); (iii), the green brand image and green trust (Nguyen-Viet et al., 2024); (iv) the environmental awareness; (v) the ethical environmental and social responsibility (Calderón-Fajardo et al., 2023); (vi) the support environment of the corporations (Eisingerich et al., 2023) and (vii) Ogiemwonyi (2024) investigate the factors that influence green behavior in two developing countries, Malaysia and Nigeria.

In general, it can be established that the research evaluates the interference of all the variables listed without specifying in financial terms and in the BE. None of the studies assumes in their analysis the variables applied in the model to be proposed in this research.

Finally, a conceptual review was made of the 31 quantitative and qualitative models proposed for the measurement of the BE focused on consumers, costing, financial and market (Washburn and Plank, 2002; Srinivasan et al., 2005; Ha, 2010; Forero and Duque, 2014; Porto et al., 2024).

2. Methodology

2.1. Selection of brands to study

The companies chosen for this study were Ecopetrol S.A., a Colombian oil company, and Naturgy Energy Group S.A., formerly known as Gas Natural Fenosa, a Spanish energy firm. Both companies are highly esteemed in the energy sector in their respective countries and conduct activities that are particularly sensitive to consumer concerns due to their real or perceived negative environmental impacts, which are increasingly recognized and internalized by the public. As a result, both companies are striving to innovate or transition to more environmentally friendly production processes, aimed to establish a new image that aligns with their CSR goals (Mattila, 2009; Kassinis and Panayiotou, 2018). But in general, they integrate environmental, economic, social aspects and cultural communications into their business actions.

Ecopetrol was established as a company in 1951 as a completely state-owned enterprise by the Colombian government. However, in 2003, due to market dynamics and government restructuring, it was transformed into a public joint stock company and was renamed Ecopetrol S.A. Its new objectives included internationalization, becoming more competitive both domestically and internationally, and transitioning to sustainable energy sources. Currently, the company has approximately 9850 employees and is actively involved in hydrocarbon exploration in various countries, including the United States, Brazil, Peru, Africa, and Asia. In 2022, Ecopetrol entered the electricity market and is currently working towards becoming a «carbon-neutral» company (Ecopetrol, 2024).

The Spanish Natural Gas Company NGG S.A. (now known as Naturgy) has a long and storied history dating back to 1843, when it first brought public lighting to Barcelona using gas. Today, Naturgy operates on five continents, with a presence in 10 European countries, 11 Latin

Table 1
Summary of literature review on Brand Equity and its dimensions.

Purpose	Methodology/Quantitative (Quan) Qualitative (Qual)	Variables Used	Results	Authors
Demonstrate that Digital Orientation (DO) has a marked influence on Brand Competitiveness (BC).	(Quan – Qual). Database compiled from multiple sources and employing techniques like natural language processing. COMPUSTAT.	Financial information: total revenues – Expense- Marketing expenses (Sales, general, & administrative expenses) - and other control variables.	They determine that the interaction between DO and strategic emphasis on value creation has a positive effect on BC.	Manjunath et al. (2024)
Explores a model that develops the relationships between university (public and private) the sustainability and brand positioning.	(Quan – Qual). 1276 data. Structural equations (PLS-SEM).	Institutional Framework- Campus Operations- Education- Research- Outreach- Campus experiences- Evaluation and Reports- Sustainability and University brand - Brand image- Brand identity - Perceived quality.	The empirical analysis found that some dimensions of university sustainability, such as the institutional framework, campus operations and some dimensions of the substantive functions, positively affect brand positioning in university students and generate commitment to the university from both the prestige and reputation of the brand.	Castro-Gómez et al. (2024)
Evaluate the value that consumers place on Corporate Social Responsibility (CSR).	(Quan). Questionnaire completed by 269 people. Structural equations (PLS-SEM).	CSR activities in the economic - Social and environmental dimensions in the generation of Brand equity (BE) - Corporate reputation (CR) - Willingness to pay (WTP).	The findings show that each of the CSR dimensions contributes differently to the generation of BE, CR and WTP, also highlighting the value of brand credibility as a variable with an important mediating effect.	Gálvez-Sánchez et al. (2024)
Establish that the sensory experience of a brand is a fundamental variable that exerts influence on the brand.	(Quan). Questionnaire survey of 304 Chinese consumers. Structural equations (PLS-SEM). Software SmartPLS4.	Sensory brand experience - Brand attitude - Brand-self connection - Brand loyalty.	Sensory brand experience directly and indirectly impacts brand loyalty. Sensory brand experience, together with brand attitude and brand-self connection, has 92.2% explanatory power to brand loyalty.	Gao & Shen. (2024)
Examine the impact of poor corporate social responsibility engagement signalled through negative environmental and social (E&S) incidents on equity financing via seasoned equity offerings (SEOs) across 25 countries.	(Quant). Descriptive statistics. The database covers over 7000 companies across countries.	Impact of negative environmental and social (E&S) - The CSR - Environmental and social risks matter- Investments - Firm's reputational risk exposure - Firm's regulatory risk exposure.	The study offers important economic implications regarding corporate sustainability for international businesses by demonstrating the repercussions of negative environmental and social misconducts on the cost of raising equity capital. The observed value impact of negative E&S incidents around new equity offerings reflects the growing investor attention paid to corporate social outcomes, particularly to the adverse events that reveal more about the true state of firms' corporate social performance.	Ho et al. (2024)
The CSR and behavioral intentions in an emerging market: The mediating roles of green brand image and green trust.	(Quan). Employ the stimulus-organism-response model. used to test the structural and measurement models and hypothetical relationships. The sample comprised 332 responses from stakeholders.	Tested the relationship between CSR - Green brand image (GBI) and Green trust (GT).	GT and CSR positively influenced word-of-mouth, willingness-to-pay, and green purchase intentions, with trust and commitment to sustainability being important drivers. While GBI positively influences purchase intention and willingness-to-pay, it has a weak effect on word-of-mouth intention, indicating that additional strategies are needed to stimulate word of mouth.	Nguyen-Viet et al. (2024)
Investigate the factors that influence green behavior in two developing countries, Malaysia and Nigeria.	(Quan). Based on the Theory of Planned Behavior (TPB) and Theory of Reasoned Action (TRA). A total of 547 participants were surveyed using a quantitative approach.	Includes factors such as green culture, Green product trust- Product value- Price sensitivity - Environmental awareness.	The analysis indicated that the model is valid in the chosen developing nations. The results emphasize the value of raising environmental awareness in order to promote environmentally friendly behavior toward the natural world.	Ogiemwonyi. (2024)
Evaluate brand equity in the hospitality industry.	(Quan). Questionnaires, interviews and customer reviews (250) of Amari Hotels. Algorithm <i>k-mean</i> . Bayes' Theorem. Jaccard similarity.	Brands reputation – Competitiveness – Emotion – Reputation – Sentiment.	From a theoretical perspective, the examination of customer reviews identified four distinct customer segments, with an impressive 90% displaying high loyalty and a strong inclination to recommend	Piriyakul et al. (2024)

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Table 1 (continued)

Purpose	Methodology/Quantitative (Quan) Qualitative (Quat)	Variables Used	Results	Authors
Measuring employee-consumer integrated retailer brand equity.	(Quan). Surveys (361). Structural equations (PLS-SEM). Hierarchical component model (HCM).	Store image – Product quality- Price/Value- Service quality- Brand allegiance - Brand consistent – Behaviour - Brand – Endorsement - Internal -advancement- Resume power -Skills development - Work demands - Loyalty - Trust.	the brand. These findings align with prior research on brand awareness and performance, emphasizing the hotel's positive reputation and brand equity. Additionally, introducing novel dimensions of perceived value and supporting self-esteem theory and Maslow's hierarchy of needs. Introduce a formal definition of brand competitiveness through a mathematical model, considering four characteristics of a brand: (i) quality (ii) price, (iii) the effectiveness of the firm's marketing campaign, and (iv) peer recommendations. Demonstrates the value-adding synergies associated with the combination of sociology, strategic brand management and economics.	Rudkowski. (2024)
Specify the dimensions of consumer perceived brand transparency.	(Quan - Quat). Data was obtained from 402 participants. Structural equations (PLS-SEM).	Dimensions of consumer perceived brand transparency (perceived proactivity, clarity objectivity, proactivity, accessibility information, mediation moderation, end depend variables).	Perceived information availability as a necessary but insufficient antecedent of brand transparency to facilitate brand ethicality. Identify the mediating and moderating mechanisms that facilitate transparency's positive effects on perceptions of brand ethicality.	Sansome et al. (2024)
Determine how Brand Activism (BA) has attracted substantial attention due to consumers' rising expectations for brands to address social and political issues.	(Quan - Quat). Personal interviews. Descriptive statistics and correlations.	BA - Corporate activism- Corporate sociopolitical activism- CEO activism - Advocacy - Corporate social advocacy.	Through a rigorous scale development process involving qualitative and quantitative assessment, the Activist Brand Perception (ABP) scale emerges as a reliable instrument to capture consumer perceptions of activist brands, enabling researchers to comprehend how consumers view activist brands.	Saracevic & Schlegelmilch. (2024)
Connect the dots between brand equity and brand loyalty for retailers: The mediating roles of brand attitudes and word-of-mouth communication.	(Quan). 335 tests. Structural equations (PLS-SEM).	Consumer loyalty – Attitudes – Communications - Brand attitude - Brand reputation - Brand trust.	The model formalizes consumer attitudes toward the retailer and word of mouth communication as critical mediators of the impact of RBE —Retailer brand equity—.	Troiville. (2024)
Understanding the scientific contributions made by brand personality (BP) research, to identify its predominant themes and to propose a relevant research agenda.	(Quan - Quat). Bibliometric analysis 1051 articles (1987–2022) indexed in Scopus scientific database. Software: VOS-viewer, Bibliometrix and SciMAT. Personal interviews. Analysis of publications.	BP – Technology - Social media - Ethical environmental and social responsibility - Growing industries.	The results showed that the motor themes of BP research related to its conceptualisation, dimensions and measurement, its impact on consumer brand relationships and application in tourism destination-focused studies. Emerging BP-focused themes are its applications in virtual reality, artificial intelligence, service robots, storytelling and tourism segments, such as luxury.	Calderón-Fajardo et al. (2023)
They emphasize that CSR efforts help the environment and affirm the moral values of universalism and benevolence.	(Quan – Quant). 944 persons (managers - employees, postgraduate students) participated in the study. Descriptive statistics.	Philanthropy/ Cause Support- Environment- Employee/ Fair Labor practices - Customer elevation- Brand purchase.	Find that environment-based CSR has a stronger impact on brand purchase than these other types of CSR efforts, given its strong influence on consumers' feelings of elevation and brand-self connections.	Eisingerich et al. (2023)
The purpose of this study is to, simultaneously, analyze the effect of corporate reputation on stock returns and risk.	(Quan). A model based on firms' financial market data, through a panel data analysis which included 84,745 firm-year observations (between January 6th, 2009, and December 31th, 2019). Sample of 156 United States firms listed in the New York Stock Exchange (NYSE) and NASDAQ. Random-effects models were explored. Tests, such as the F Test, the Breusch-Pagan Test, or the Hausman Test, to determine the	Return of stock i in week t . - Risk-free return in week t . - Constant parameter estimated which denotes the abnormal returns of firms not listed in Reputation quotient (RQ) - Coefficient which measures the sensibility of stock returns from firms not listed in Reputation quotient due to changes in market returns - Market return in week t . - Market risk	The results did not provide significant variations, either for the abnormal returns or for the systematic risk, between firms listed in Reputation quotient and those not listed Results also evidence that firms listed in Reputation Quotient have a lower stock risk premium when compared with those that are not listed. This is in line with the	Febra et al. (2023)

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Table 1 (continued)

Purpose	Methodology/Quantitative (Quan) Qualitative (Quat)	Variables Used	Results	Authors
	models' quality and their consequent validation. Descriptive statistics.	premium in week t . - Constant parameter which denotes the variation of abnormal returns from firms listed in RQ, when compared to those not listed in the same ranking - Dummy variable coded 1 if firm i is listed in QR- Coefficient which measures the sensibility's change of stock returns from firms listed in RQ due to variations in market returns, when compared to those not listed in RQ.	traditional finance theory and with the literature in the area, in the sense that firms with higher reputation level have lower risk.	
Introduce mathematically a formal definition of brand competitiveness. We propose a unified formal framework, where agents, in choosing a brand, have both economical and sociological motives (consistent with the behavior of both <i>Homo economicus</i> and <i>Homo sociologicus</i>).	(Quan). Provide a mathematical modeling of the four-fold dimensions that affect individual preferences for a specific brand with respect to, and contextually situated against, others.	Four key characteristics of a brand: (i) price, (ii) quality, (iii) peer recommendations, and (iv) the effectiveness of the firm's marketing campaign.	Introduce a formal definition of brand competitiveness through a mathematical model. Demonstrates the value-adding synergies associated with the combination of sociology, strategic brand management and economics.	Della Lena & Timming, (2023)
This study contributes to brand management literature by empirically investigating the impact of brand authenticity on purchase intentions through perceived value (functional, emotional, and social) and brand forgiveness using a 2×2 between-subjects experimental design with a sample of consumers from the UK and Turkey.	(Quan - Quat). A total of five hundred and eighty-eight respondents. We used a 2 (authenticity: authentic vs. inauthentic brand) \times 2 (cross-cultural happiness: low vs. high) between-subjects experimental design with a sample of consumers from UK and Turkey. Descriptive statistics.	Brand authenticity - Functional value; Emotional value - Social value - Brand forgiveness - Purchase intentions - Emotional value - Social value - Brand forgiveness - Purchase intentions.	Conclude that the brand authenticity has an impact on purchase intentions through perceived value (emotional, functional, and social). It takes an empirical method to comprehend why customers overlook genuine businesses and how this effect differs depending on the culture.	Papadopoulou et al. (2023)
Introduces a conceptual framework based on the theoretical framework of Keller and Aakar's Customer-Based Brand Equity (CBBE) models. This conceptual framework consists of nine constructs organised into three layers: marketing programs, brand equity dimensions, and brand equity.	(Quan). Survey questionnaire to 100 consumers. Factor Analysis (EFA). Structural Equation Modelling (PLS-SEM).	Product features (PF) - Promotions- Brand awareness (BA) - Perceived quality (PQ) - Brand image (BI) - Brand preference (BP) - Brand loyalty (BL) - Brand loyalty (BL).	The results have indicated that the PF have an important role in creating positive PQ if the promotion has been made to create BA. Positive PQ helps in enhancing BI. Marketers need to focus on creating positive BP, as BI is not sufficient in creating BL and BR.	Shrestha et al. (2023)
Investigates potential associations between CEO overconfidence, customer satisfaction, and firm value. Using a dataset of US public firms spanning from 1994 to 2019.	(Quant). Using a dataset of US public firms spanning from 1994 to 2019. Employed process Macro and bootstrap confidence intervals.	Overconfidence (OVERCONF) - CEO overconfidence in prior Research- CEO overconfidence and Customer satisfaction (CS) - The mediating role of R&D (Research and Development) - and advertising.	The results contribute to the extant literature by highlighting that CEO overconfidence not only positively affects shareholder value, but also links to the consequences of strategic marketing decisions, such as customer satisfaction.	Sharpe et al. (2023)
This study adds to the literature by examining the role of the dimensions of corporate social responsibility (CSR) in employees' perceptions of the importance of CSR activities for improving brand reputation by enhancing brand equity.	(Quan). Vietnamese enterprises that engage in CSR activities in the course of their management and commercial operations. 417 suitable data samples (Questionnaires). Descriptive statistics and correlations. Structural Equation Modelling (PLS-SEM).	Seven variables were examined, namely CSD (Corporate Sustainable Development - Internal CSR activities (ICA) - External CSR activities (ECA) -The satisfaction of employees (SOE) - The implementation of CSR (IOC) - Brand reputation (BRE) - Brand equity (BEQ).	Internal and external CSR activities improve employee satisfaction and that implementing CSR activities supports the enhancement of brand reputation and adds value to brand equity.	Vuong & Bui. (2023)
The purpose of this paper is to review and analyse the customer experience (CX) literature by applying a modularity approach.	(Quat). Co-citation analysis to track the transformation of the CX literature from 1984 to 2021 with 546 articles published in business and management journals in four intellectual time periods (1984–2005, 2006–2010, 2011–2015, and 2016–2021). multi-method was employed: multidimensional scaling (MDS) and hierarchical cluster analysis (HCA) were used to investigate the knowledge structure of CX.	This research followed several steps: (1) identifying the focal data in each period, (2) conducting an analysis of the focal data, and (3) identifying the research groups and cliques (MDS) and research clusters (HCA). The overview of co-citation, with the words: customer experience (along with its dimensions), consumer experience, service experience, brand experience, and retailing experience.	The results show evidence of a vibrant multivocal CX literature landscape, with a dynamic and evolving intellectual structure staffed by a coalition of intellectual inputs from the three major marketing systems and their corresponding logics – service marketing logic, experiential marketing logic, and branding logic. Explains that the Customer Experience (CX) is becoming commonly acknowledged as a	Zha et al. (2023)

(continued on next page)

Table 1 (continued)

Purpose	Methodology/Quantitative (Quan) Qualitative (Qual)	Variables Used	Results	Authors
Stakeholders have long pressured firms to provide societal benefits in addition to generating shareholder wealth. Such benefits have traditionally come in the form of Corporate social responsibility (CSA). However, many stakeholders now expect firms to demonstrate their values by expressing public support for or opposition to one side of a partisan sociopolitical issue, a phenomenon the authors call CSA).	(Qual). Using signaling and screening theories, the authors analyze 293 CSA (Corporate sociopolitical activism) events initiated by 149 firms across 39 industries. Variables collected from COMPUSTA. Descriptive statistics.	The stock market reaction to CSA- Degree of deviation from stakeholders' values - Degree of deviation from the firm's brand image- Form of support - Announcement source stature - Business interest communication - Coalition size.	comprehensive framework for elucidating and assessing a product's or brand's efficacy. Suggest that managers should carefully consider how to implement CSA because it influences investors' inferences about the firm's commitment to activism versus its fiduciary duties. Identify four characteristics of CSA implementation to which investors are particularly discerning.	Bhagwat et al. (2020)
How Market Share Determines the Impact of Corporate Political Advocacy (CPA).	(Qual). The study was attended by 509 undergraduates students from a U.S. East Coast university.	CPA-CSR (Corporate social responsibility) - Market-level effects - Brand perceptions (size, market share, familiarity, and quality).	The authors posit that despite this negativity bias in individual-level choice, the net effect of CPA at the market level is determined by a sorting process that benefits small-share brands and hurts large-share brands.	Hydock et al. (2020)
Answer the question: How do consumers react when brands take a stand on controversial socio-political issues? Discuss the theoretical and practical implications of the findings and call for further research on brand activism.	(Qual). Descriptive statistics.	Attitude towards the brand; Consumer-brand Agreement – Consumer - brand identification - Moral Anger.	The results from a series of studies, involving both unknown and well-known brands, show that attitudes towards the brand decreased substantially among consumers who disagreed with a brand's stand, whereas there was no significant effect among consumers who were supportive of the brand's stand. Is possible that brand activism positively influences consumer attitudes, intentions, and behavior in the long term.	Mukherjee & Althuizen. (2020)
The purpose of this study is to understand in what ways corporate social advocacy influences individuals' views of controversial social issues.	(Quan). ELM model. Descriptive statistics.	Involvement and attitude change - Advocacy fit - Corporate credibility - The bandwagon heuristic - ORI (outcome-relevant involvement) - VRI (value-relevant involvement) – Realism - Attitude change.	The study reveals that a corporate statement on a controversial social issue is effective in changing an individual's attitude toward the issue depending on how much the issue is relevant to the individual's goals and/or if the corporate statement is supported by other corporations. Corporate credibility did not have any significant effect on whether individuals changed their attitudes.	Parcha & Westerman. (2020)
The purpose is to conceptualize the holistic nature of brand image for fashion-related products and to complete the initial stage of scale development, determining content validity, for a new brand image measure.	(Qual). Based on a review of academic and industry literature and analysis of qualitative data from 11 in-depth interviews. To help assess content validity, four trained judges assessed the face validity of the initial 140 items generated; 137 scale items were retained.	Cognitive associations – Mystery - Emotional associations: intimacy.	Analysis of the interview data revealed that cognitive (mystery), emotional (intimacy) and sensory (sensuality) dimensions were important for brand image of fashion-related products. The results aligned with major themes proposed in the literature, but one additional theme (self-congruity) was uncovered. These findings support content validity of the brand image scale items.	Cho et al. (2015)

Source: Authors.

American countries, including Colombia, six African countries, and four countries in Asia and Oceania. The company has over 16 million supply points installed and is the third largest gas and electricity distributor in the Spanish energy market, serving over 23 million customers with a workforce of approximately 20,000 employees. Naturgy's global workforce is comprised of 49.5 % employees based in America, 45.9 % in

Europe, and the remaining 4.6 % in Africa, Asia, and Oceania ([Naturgy, 2024](#)).

2.2. Selection of variables and attributes

The most critical stage in the construction of a model to measure

brand value is the selection of the attributes or variables, as the alternatives must be accurate, credible, and feasible. This selection was based on a conceptual review of BE and an analysis of 31 models, both quantitative and qualitative. From this analysis, two criteria were identified: «Convenience» and «Repetition». Three variables or attributes were selected based on their frequency of use in the reviewed studies: (i) «Experience», which is defined as the opinion that the interviewee has about the brand after being exposed to a communicative or advertising impact and is present in ten models. (ii) «Visibility», which is the ability of interviewees or customers to recognize a brand by displaying a stimulus and is present in seven models. It is determined by the relationship established by the consumer with the brand, including communication, interaction, and transaction of the product or service. (iii) «Loyalty», which is a positive, preferential, and permanent attitude of a customer when purchasing a brand or service and is present in six models. For this reason, certain brands are referred to as «lovemarks» for their ability to earn the loyalty and devotion of their customers (Dick and Kunal, 1994; Molina and Morán, 2013; Gutiérrez, 2022). According to consumer perspectives, the three variables and attributes should be uniformly represented in both quantitative and qualitative models, however, this is not always the case. One particular model, Ensemble Analysis, encompasses all three variables in its analyses and is



considered a qualitative and theoretical framework.

Lastly, in proposing this study, Corporate Social Responsibility (CSR) as perceived by respondents, was incorporated, defined as a company's dedication to acting in a way that promotes environmental, economic, and social improvement, ultimately reflecting an ethical commitment (Windsor, 2006; Mahmood and Bashir, 2020; Ruiz and García, 2021; Eisingerich et al., 2023; Nguyen-Viet et al., 2024).

2.3. Research hypothesis

Based on a comprehensive examination of qualitative and quantitative models related to BE evaluation, and in light of the latest cultural awareness to a company's social, emotional, and environmental commitment (summarized as Corporate Social Responsibility, CSR), the central research question of the present study was: How can attention to these sensibilities serve as a strategy for brands to increase their recognition, credibility, acceptance and commercial value among customers? In turn, the following sub hypotheses are proposed:

H1. Visibility (VIS) has a significant positive influence on customer Loyalty (LOYAL)?

	OLD	NEW
Logo		

Missional Objective

The mission of Gas Natural Fenosa is to meet the energy needs of society, providing its customers with quality services and products that are respectful of the environment, its shareholders growing and sustainable profitability, and its employees the possibility of developing their professional skills.

Our main objective is to provide energy to society to maximize its development and well-being, where innovation, energy efficiency and sustainability are our fundamental pillars.

	OLD	NEW
Logo		

Missional Objective

Ecopetrol will be a highly competitive international oil and gas company with world-class and socially responsible human talent.

Per the Bylaws, the corporate purpose of Ecopetrol S.A. is the development, in Colombia or abroad, of commercial or industrial activities corresponding to or related to the exploration, exploitation, refining, transport, storage, distribution and commercialization of hydrocarbons, their derivatives, and products.

Source: Authors.

Fig. 1. The old and current logos and mission objectives of Ecopetrol S.A. and Naturgy.

H2. Loyalty (LOYAL) has a significant positive influence on customer Experience (EXP)?

H3. Visibility (VIS) has a significant positive impact on customer Experience (EXP)?

H4. Visibility (VIS) Loyalty (LOYAL) and Experience (EXP) are related and have a significant weight to evaluate brand value?

2.4. Survey design for the evaluation of the selected variables

The survey was designed around a comparison of old and new company logos and mission statements (Fig. 1 and Supplementary Material 1). In the left column are the old logos and objectives of the two selected brands, Ecopetrol S.A. y Naturgy. On the right column are the logos and new mission objectives.

For the variables or attributes implemented in the research, questions were formulated (Supplementary Material 1), and the response levels were defined according to Likert Scales (Likert, 1932; Cañadas and Sánchez-Bruno, 1998; Edmondson, 2005; Dawes, 2008; Subedi, 2016), which allowed them to be evaluated and measured from the consumer's perspective. Each question allowed the selected variable or attribute to be measured along a gradient or scale, to gauge the attitudes of the respondents and the extent to which they agree or disagree with a particular question or statement.

The scale was designed at an ordinal measurement level, as recommended by its author and other researchers (Salkind, 1998; Matas, 2018). It should be noted that psychological distances between the alternatives of the scale were not equal, which has direct repercussions on the measurement, as well as the quality and interpretability of the data (Kennedy et al., 1996; Merino, 2002).

Five blocks of questions were constructed that evaluated customer socioeconomic background, the three main variables of the BE (*Visibility*, *Loyalty*, and *Experience*) and, finally, customer knowledge and perception of *Corporate Social Responsibility*. The survey consisted of 21 questions distributed as follows:

1. General socioeconomic conditions: made up of six questions that inquired about the age, sex, educational level and occupation of the respondents. To advance the socioeconomic characterization of the sample.
2. Visibility: made up of four questions which specifically examined the level of awareness of the brands by the respondents.
3. Loyalty: made up of two questions which explored the willingness of the respondents to own or conduct specific actions with the brands.
4. Experience: made up of five questions which sought to record the information that the respondents had about the brand and its environment.
5. Corporate Social Responsibility (CSR): composed of three questions which examined the knowledge and perception of the respondents regarding the importance of CSR with respect to the brands analyzed.

In-depth surveys were conducted in Spain and Colombia during 2022 through electronic media and social networks and direct contact with researchers, students, experts on the topic of hydrocarbons, and people who had first-hand references from companies and consumers. The aim was to obtain a representative but stratified sample using the snowball sampling strategy, which allows large samples of information to be captured through intentional sampling (Spreen, 1992).

2.5. Statistical analysis

1. Coding and analysis of the evaluated variables. Table 2 presents the description and coding of the variables considered in the investigation. To facilitate the reading and development of the statistical analyses, the *Visibility* variables were coded with the VIS code (from

1 to 14); *Loyalty*, with the LEAL code (from 1 to 16), and *Experience*, with the code EXP (from 1 to 28).

2. For the evaluation of the consistency and validity of the instruments, Cronbach's Alpha coefficient (α) was applied, which allows measuring the reliability of the internal consistency of the scales measured. A confirmatory factor analysis (CFA) was performed to establish the convergent validity and the discriminant validity of the scales (Cronbach, 1951; Anderson and Gerbing, 1988).
3. Structural Equation Modeling (SEM) was conducted to evaluate the hypothesized relationships between three of the four main factors: *Visibility*, *Loyalty*, and *Experience*. Complex causal relationships between multiple latent variables were established and estimated using the SEM method, which also controls for measurement errors. The chi-square relationship between the degrees of freedom and the model's goodness of fit was measured by the comparative index arrangement, Tucker-Lewis index, residual standardized root mean squared, and the root mean squared error of approximation. For the index to be acceptable, X^2/df must not exceed 5, CFI and TLI must be greater than 0.90, and RMSEA and SRMR must be <0.08 (Wu, 2009; Byrne, 2010; Muñoz-García and Villena-Martínez, 2020).
4. Bootstrapping was applied (500 bootstrap samples) to evaluate the effects of serial multiple mediation within the causal chain of the model and to predict BE. A 95 % bias-corrected bootstrap confidence interval that does not include zero was considered to indicate absence of significant spillover effects while reducing the probability of type 1 errors (Preacher and Hayes, 2008).
5. Descriptive statistics were used to summarize typical characteristics of samples and variables. CFA and SEM analyses were performed using the STATA software package, applying the maximum likelihood estimation model (StataCorp, 2017).

2.6. Presampling

To ensure the soundness of the sampling design and the robustness of the model, a preliminary assessment was conducted on a sub-sample of 34 surveys. This indicated a validity of 85 %, which was considered acceptable. Subsequently, the survey was administered comprehensively, taking into account the feedback, suggestions, and contributions of the participants (see Supplementary Material 1).

3. Results and discussion

3.1. Survey sample characteristics

Six hundred and forty surveys were conducted, which were completed in their entirety. 56.4 % of those surveyed were based in Colombia, 41.4 % in Spain, and 2.2 % in other countries and regions. >70 %, the respondents were young adults; with 60.8 % of those surveyed being female and 38.8 % male (Fig. 2).

Furthermore, 58.1 % of the respondents were students (mainly university students) and 32.7 % reported being economically active. Regarding educational background, 45.6 % had university degrees, followed by 20.9 % with basic secondary education (Fig. 2). Finally, 37.2 % of those surveyed did not receive economic income due to their being university students, followed by 25.50 % who reported monthly income of less than €500 and 8.28 % between €2000 and €4000.

In summary, the survey population is considered balanced in terms of nationality and gender, but with a predominance of young adults, mainly university students, with no to low monthly income.

3.2. Corporate social responsibility (CSR) perception

Regarding visual perception and its relationship with the color green, 66.9 % of those surveyed related it to CSR, followed by 19.4 %, who considered blue the color that best represented this corporate environmental characteristic (Fig. 3).

Table 2
Qualification of the Variables and Attributes Measured in the Survey.

Visibility					
ID	CODE	VARIABLE	QUESTION	SCALE 1	SCALE 2
1	VIS ₁	VISODLECOPEPETROL ₁ = It refers to the old Ecopetrol logo.	Below are the logos of the companies to be studied. For each one, select the degree to which you know them according to the scale presented. OLD ECOPEPETROL.	Completely unknown	Completely known
2	VIS ₂	VISNEWECOPEPETROL ₂ = It refers to the new Ecopetrol logo.	Below are the logos of the companies to be studied. For each one, select the degree to which you know them according to the scale presented. NEW ECOPEPETROL.	Completely unknown	Completely known
3	VIS ₃	VISFENOSA ₃ = It refers to the Gas Natural Fenosa logo.	Below are the logos of the companies to be studied. For each one, select the degree to which you know them according to the scale presented. FENOSA NATURAL GAS.	Completely unknown	Completely known
4	VIS ₄	VISNATURGY ₄ = It refers to the Naturgy logo symbol.	Below are the logos of the companies to be studied. For each one, select the degree to which you know them according to the scale presented. NATURGY.	Completely unknown	Completely known
5	VIS ₅	VISODLECOPEPETROL ₅ = It refers to Ecopetrol's old mission objective.	The mission objectives of the companies are presented below. Establish if you have prior knowledge of that information, based on the scale presented. OLD ECOPEPETROL.	Completely unknown	Completely known
6	VIS ₆	VISNEWECOPEPETROL ₆ = It refers to Ecopetrol's new mission objective.	The mission objectives of the companies are presented below. Establish if you have prior knowledge of that information, based on the scale presented. NEW ECOPEPETROL.	Completely unknown	Completely known
7	VIS ₇	VISFENOSA ₇ = It refers to the mission objective of Gas Natural Fenosa.	The mission objectives of the companies are presented below. Establish if you have prior knowledge of that information, based on the scale presented. FENOSA NATURAL GAS.	Completely unknown	Completely known
8	VIS ₈	VISNATURGY ₈ = It refers to Naturgy's mission objective.	The mission objectives of the companies are presented below. Establish if you have prior knowledge of that information, based on the scale presented. NATURGY.	Completely unknown	Completely known
9	VIS ₉	VISTOTALECOPEPETROL ₉	In the previous questions, the logos and mission objectives of the companies have been shown. Rate whether you previously knew or had heard about them, using the following scale: 1 completely unknown and 7 completely known. ECOPEPETROL.	Completely unknown	Completely known
10	VIS ₁₀	VISTOTALNATURGY ₁₀	In the previous questions, the logos and mission objectives of the companies have been shown. Rate whether you previously knew or had heard about them, using the following scale: 1 completely unknown and 7 completely known. NATURGY.	Completely unknown	Completely known
11	VIS ₁₁	VISODLECOPEPETROL ₁₁ = It refers to the old Ecopetrol logo.	Based on the scale presented, determine if it is possible to describe the type of company represented by each of the following logos: OLD ECOPEPETROL.	I am completely unaware	I fully recognize it
12	VIS ₁₂	VISNEWECOPEPETROL ₁₂ = It refers to the new Ecopetrol logo.	Based on the scale presented, determine if it is possible to describe the type of company represented by each of the following logos: NEW ECOPEPETROL.	I am completely unaware	I fully recognize it
13	VIS ₁₃	VISFENOSA ₁₃ = It refers to the Gas Natural Fenosa logo.	Based on the scale presented, determine if it is possible to describe the type of company represented by each of the following logos: GAS NATURAL FENOSA.	I am completely unaware	I fully recognize it
14	VIS ₁₄	VISNATURGY ₁₄ = It refers to the Naturgy logo symbol.	Based on the scale presented, determine if it is possible to describe the type of company represented by each of the following logos: NATURGY.	I am completely unaware	I fully recognize it
Loyalty					
15	Loy ₁	LEALECOPODL ₁ = It refers to the old Ecopetrol logo.	Based on the scale presented, determine the degree of trust communicated by each of the following brands through their logos: OLD ECOPEPETROL.	Total mistrust	Total mistrust
16	Loy ₂	LEALECOPNEW ₂ = It refers to the new logo of Ecopetrol.	Based on the scale presented, determine the degree of trust communicated by each of the following brands through their logos: NEW ECOPEPETROL.	Total mistrust	Total mistrust
17	Loy ₃	LEALFENOSA ₃ = It refers to the Gas Natural Fenosa logo.	Based on the scale presented, determine the degree of trust communicated by each of the following brands through their logos: GAS NATURAL FENOSA.	Total mistrust	Total mistrust
18	Loy ₄	LEALNATURGY ₄ = It refers to the Naturgy logo symbol.	Based on the scale presented, determine the degree of trust communicated by each of the following brands through their logos: NATURGY.	Total mistrust	Total mistrust
19	Loy ₅	LEALECOPODL ₅ = It refers to Ecopetrol's old mission objective.	Based on the scale presented, determine the degree of trust communicated by each of the following brands through their mission objectives: OLD ECOPEPETROL.	Total mistrust	Total mistrust
20	Loy ₆	LEALECOPNEW ₆ = It refers to Ecopetrol's new mission objective.	Based on the scale presented, determine the degree of confidence communicated by each of the following brands through their mission objectives: NEW ECOPEPETROL.	Total mistrust	Total mistrust
21	Loy ₇	LEALFENOSA ₇ = It refers to the mission objective of Gas Natural Fenosa.	Based on the scale presented, determine the degree of trust communicated by each of the following brands through their mission objectives: GAS NATURAL FENOSA.	Total mistrust	Total mistrust
22	Loy ₈	LEALNATURGY ₈ =It refers to Naturgy's mission objective.	Based on the scale presented, determine the degree of trust that each of the following brands communicates through its mission objectives: NATURGY.	Total mistrust	Total mistrust

(continued on next page)

Table 2 (continued)

Visibility					
ID	CODE	VARIABLE	QUESTION	SCALE 1	SCALE 2
23	Loy 9	LEALECOPDL9=It refers to the old Ecopetrol logo.	Based on the scale presented, determine the degree of solidity that each of the following brands inspires you through their logos in order to invest capital: OLD ECOPETROL	I would not choose this brand	I would choose this brand without hesitation.
24	Loy 10	LEALECOPNEW10= It refers to the new Ecopetrol logo.	Based on the scale presented, determine the degree of solidity that each of the following brands inspires you through their logos in order to invest capital: NEW ECOPETROL.	I would not choose this brand	I would choose this brand without hesitation.
25	Loy 11	LEALFENOSA11= It refers to the Gas Natural Fenosa logo.	Based on the scale presented, determine the degree of solidity that each of the following brands inspires you through their logos in order to invest capital: GAS NATURAL FENOSA.	I would not choose this brand	I would choose this brand without hesitation.
26	Loy 12	LEALNATURGY12=It refers to the Naturgy logo symbol.	Based on the scale presented, determine the degree of solidity that each of the following brands inspires you through their logos in order to invest capital: NATURGY.	I would not choose this brand	I would choose this brand without hesitation.
27	Loy 13	LEALECOPDL13= It refers to Ecopetrol’s old mission objective.	Based on the scale presented, determine the degree of solidity that each of the following brands inspires you through your mission objectives in order to invest capital: OLD ECOPETROL.	I would not choose this brand	I would choose this brand without hesitation.
28	Loy 14	LEALECOPNEW14= It refers to Ecopetrol’s new mission objective. LEALECOPNEW14= Refers to Ecopetrol’s new mission objective.	Based on the scale presented, determine the degree of solidity that each of the following brands inspires you through your mission objectives in order to invest capital: NEW ECOPETROL.	I would not choose this brand	I would choose this brand without hesitation.
29	Loy 15	LEALFENOSA15= It refers to the mission objective of Gas Natural Fenosa.	Based on the scale presented, determine the degree of solidity that each of the following brands inspires you through its mission objectives in order to invest capital: GAS NATURAL FENOSA.	I would not choose this brand	I would choose this brand without hesitation.
30	Loy 16	LEALNATURGY16= It refers to Naturgy’s mission objective.	Based on the scale presented, determine the degree of solidity that each of the following brands inspires you through your mission objectives in order to invest capital: NATURGY.	I would not choose this brand	I would choose this brand without hesitation.
Experience					
31	EXP1	EXPECOPEOLD1= Refers to the old Ecopetrol logo.	Establish if the following logos represent the essence of each company: OLD ECOPETROL.	Not at all	Completely
32	EXP2	EXPECOPENEW2= Refers to the new Ecopetrol logo.	Establish if the following logos represent the essence of each company: NEW ECOPETROL.	Not at all	Completely
33	EXP3	EXPFENOSA3= Refers to the Gas Natural Fenosa logo.	Establish if the following logos represent the essence of each company: GAS NATURAL FENOSA.	Not at all	Completely
34	EXP4	EXPNATURGY4= Refers to the Naturgy logo.	Establish if the following logos represent the essence of each company: NATURGY.	Not at all	Completely
35	EXP5	EXPECOPEOLD5= Refers to Ecopetrol’s old mission objective.	Establish if the following mission objectives represent the essence of each company: OLD ECOPETROL.	Not at all	Completely
36	EXP6	EXPECOPENEW6= Refers to Ecopetrol’s new mission objective.	Establish if the following mission objectives represent the essence of each company: NEW ECOPETROL.	Not at all	Completely
37	EXP7	EXPFENOSA7= Refers to the mission objective of Gas Natural Fenosa.	Establish if the following mission objectives represent the essence of each company: GAS NATURAL FENOSA.	Not at all	Completely
38	EXP8	EXPNATURGY8= Refers to Naturgy’s mission objective.	Establish if the following mission objectives represent the essence of each company: NATURGY.	Not at all	Completely
39	EXP9	EXPECOPEOLD9= Refers to the old Ecopetrol logo.	Your perception when observing this logo is: OLD ECOPETROL.	Negative/mistrust	Positive/Trust
40	EXP10	EXPECOPENEW10= Refers to the new Ecopetrol logo.	Your perception when observing this logo is: NEW ECOPETROL.	Negative/mistrust	Positive/Trust
41	EXP11	EXPFENOSA11= Refers to the Gas Natural Fenosa logo.	Your perception when looking at this logo is: GAS NATURAL FENOSA.	Negative/mistrust	Positive/Trust
42	EXP12	EXPNATURGY12= Refers to the Naturgy logo.	His perception when observing this logo is: NATURGY.	Negative/mistrust	Positive/Trust
43	EXP13	EXPECOPEOLD13= Refers to Ecopetrol’s old mission objective.	Their perception when observing this mission objective is: OLD ECOPETROL.	Negative/mistrust	Positive/Trust
44	EXP14	EXPECOPENEW14= Refers to Ecopetrol’s new mission objective.	Their perception when observing this mission objective is: NEW ECOPETROL.	Negative/mistrust	Positive/Trust
45	EXP15	EXPFENOSA15= Refers to the mission objective of Gas Natural Fenosa.	Their perception when observing this mission objective is: GAS NATURAL FENOSA.	Negative/mistrust	Positive/Trust
46	EXP16	EXPNATURGY16= Refers to Naturgy’s mission objective.	His perception when observing this mission objective is: NATURGY.	Negative/mistrust	Positive/Trust
47	EXP17	EXPECOPEOLD17= Refers to the old Ecopetrol logo.	If you have previous knowledge of the following companies, determine on the scale presented, if the logo symbol corresponds to the real action that is expressed in the mission objectives of the brand;	Not at all close to reality	Completely coherent
48	EXP18	EXPECOPENEW18= Refers to the new Ecopetrol logo.	If you do not have prior knowledge, rate according to the scale presented, how coherent do you find the logos in relation to the mission objectives of the brand.	Not at all close to reality	Completely coherent
49	EXP19	EXPFENOSA19= Refers to the Gas Natural Fenosa logo.	If you have previous knowledge of the following companies, determine on the scale presented, if the logo symbol corresponds to the real action that is expressed in the mission	Not at all close to reality	Completely coherent

(continued on next page)

Table 2 (continued)

Visibility					
ID	CODE	VARIABLE	QUESTION	SCALE 1	SCALE 2
50	EXP ₂₀	EXPNATURGY20= Refers to the Naturgy logo symbol.	objectives of the brand; If you do not have prior knowledge, rate according to the scale presented how coherent you find the logos in relation to the mission objectives of the brand. GAS NATURAL FENOSA LOGO. If you have previous knowledge of the following companies, determine on the scale presented, if the logo symbol corresponds to the real action that is expressed in the mission objectives of the brand; If you do not have prior knowledge, rate according to the scale presented how coherent you find the logos in relation to the mission objectives of the brand. NATURGY LOGO.	Not at all close to reality	Completely coherent
51	EXP ₂₁	EXPECOPEOLD21= Refers to Ecopetrol's old mission objective.	If you have previous knowledge of the following companies, determine on the scale presented, if the logo symbol corresponds to the real action that is expressed in the mission objectives of the brand; If you do not have prior knowledge, rate according to the scale presented how coherent you find the logos in relation to the mission objectives of the brand. OLD ECOPETROL MISSION.	Not at all close to reality	Completely coherent
52	EXP ₂₂	EXPECOPENEW22= Refers to Ecopetrol's new mission objective.	If you have previous knowledge of the following companies, determine on the scale presented, if the logo symbol corresponds to the real action that is expressed in the mission objectives of the brand; If you do not have prior knowledge, rate according to the scale presented how coherent you find the logos in relation to the mission objectives of the brand. NEW ECOPETROL MISSION.	Not at all close to reality	Completely coherent
53	EXP ₂₃	EXPFENOSA23= Refers to the mission objective of Gas Natural Fenosa.	If you have previous knowledge of the following companies, determine on the scale presented, if the logo symbol corresponds to the real action that is expressed in the mission objectives of the brand; If you do not have prior knowledge, rate according to the scale presented how coherent you find the logos in relation to the mission objectives of the brand. GAS NATURAL FENOSA MISSION.	Not at all close to reality	Completely coherent
54	EXP ₂₄	EXPNATURGY24= Refers to Naturgy's mission objective.	If you have previous knowledge of the following companies, determine on the scale presented, if the logo symbol corresponds to the real action that is expressed in the mission objectives of the brand; If you do not have prior knowledge, rate according to the scale presented how coherent you find the logos in relation to the mission objectives of the brand. NATURGY MISSION.	Not at all close to reality	Completely coherent
55	EXP ₂₅	EXPECOPENEW25= Refers to the new Ecopetrol logo.	Based on the scale presented, determine the degree of interaction you have had with each of the following brands: NEW ECOPETROL LOGO.	I have not had interaction	I have had permanent interactions
56	EXP ₂₆	EXPNATURGY26= Refers to the Naturgy logo.	Based on the scale presented, determine the degree of interaction you have had with each of the following brands: LOGO NATURGY.	I have not had interaction	I have had permanent interactions
57	EXP ₂₇	EXPECOPENEW27= Refers to the new Ecopetrol logo.	Establish the level of coherence between the brand, the logo and its actions expressed in the following logos. NEW ECOPETROL.	It's not coherent at all	completely coherent
58	EXP ₂₈	EXPNATURGY28= Refers to the Naturgy logo.	Establish the level of coherence between the brand, the logo and its actions expressed in the following logos. NATURGY.	It's not coherent at all	completely coherent

Source: Authors.

Twenty-eight percent of the sample population reported having a very high degree of familiarity with the concept of CSR, followed by 23 % who declared having high knowledge of it and 30 % indicating medium familiarity. In summary, approximately 81 % of respondents reported significant knowledge of the CSR concept.

A relevant finding is that 62 % of the respondents considered it very important for a brand to have CSR. And 92 % of the sample considered it important or very important for companies to emphasize this aspect, which indicates that there is substantial susceptibility among those surveyed for the socio-environmental impacts of energy companies and the inclusion of aspects of CSR in their brands.

Regarding the statement that presenting green communications indicates CSR, 51 % disagreed, 35 % agreed, and 14 % said they were neutral. When asked whether they would prefer buying a brand that used green communications to one that did not, 73 % said yes, 17 % negated, and 10 % were neutral.

3.3. Analysis of perceptions between conventional logos and «green» logos

Different logo versions were compared to determine whether there were statistically significant differences between their perception by customers in terms of implied CSR. Two types of analyses were conducted: (i) descriptive statistics (frequencies), and (ii) the Friedman Test, to determine whether there was a statistically significant difference among customer responses regarding the three BE categories. The results for each category are presented below.

The data show that a conventional logo without «green messages», such as The *Visibility* Category: VisoldEcopetrol1 vs. the «green» logo (VisnewEcopetrol2) presented statistically significant differences regarding acceptance and knowledge of respondents ($p = 0.0000$). Similarly, the logos of GNF —VisFenosa3— and Naturgy —VisNaturgy4— presented differences in the degree they were perceived as «green» and «sustainable». Comparing responses between the two brands, a Friedman Test yielded a value of $p = 0.69$, indicating no statistically significant differences between the Visibility and

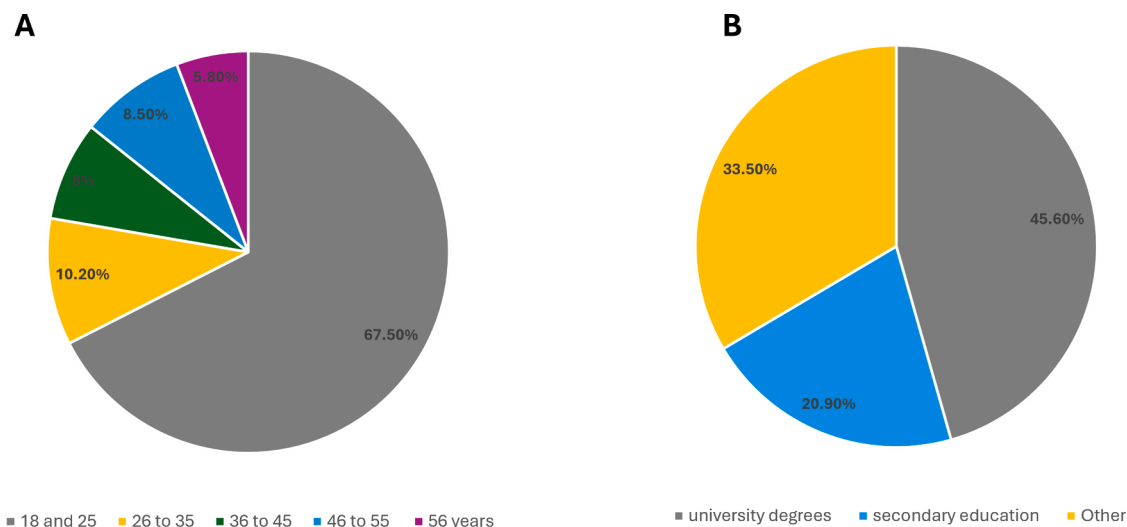


Fig. 2. Survey sample characteristics. A. Respondents age ranges. B. Respondents educational background.

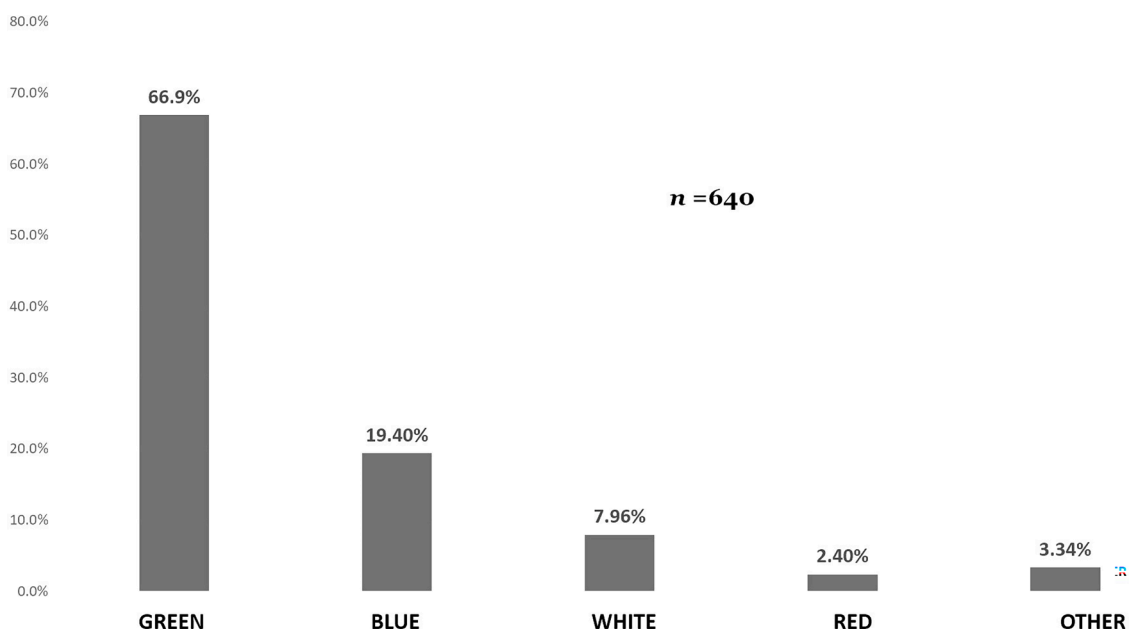


Fig. 3. Visual perception of Corporate Social Responsibility.

acceptance of a brand when its logo contains explicit «green» or «sustainable» elements (Fig. 4).

The previous analyses indicate that, in the Visibility category, incorporating «green» content or references to «sustainability» can lead to increased visibility and acceptance. Furthermore, it is clear that there is a significant difference in perception between conventional, non-green logos and those that include «green» elements. Specifically, logos with «green» content have an acceptance rate of 77 %. This trend holds true for all variables within the Visibility category, including the mission objectives of the brands.

The Loyalty Category: The results of the Friedman Test indicate that brands that incorporate «green» content or references to «sustainability» in the Loyalty category elicit a higher level of loyalty and acceptance, with >70 % of respondents expressing this sentiment. Additionally, the test reveals that the perception of consumers varies significantly when comparing conventional, non-green logos with those that incorporate «green» content and references to «sustainability» (as depicted in Fig. 4). The Friedman Test also demonstrates that, in the case of

Ecopetrol, incorporating «green» content or references to «sustainability» in the logos leads to increased loyalty and acceptance within the Loyalty category. The test further reveals that the perception of consumers differs significantly when comparing conventional, non-green logos with those that incorporate «green» content (as illustrated in Fig. 4).

The Experience Category: In the Experience category, the results had p values <0.05, suggesting that the presence of brand logos featuring «green» content or references to «sustainability» lead to a higher Experience, and translates to an acceptance score of 75 %. This finding also suggests a stronger customer appreciation of CSR (Fig. 4).

3.4. Structural equation model

3.4.1. Descriptive statistics

According to Table 3, the average of the variables in the SEM ranged from 2.57 to 6.14, while their standard deviation varied between 1.49 and 2.47. The asymmetry values fluctuated between -2.08 and 1.79,

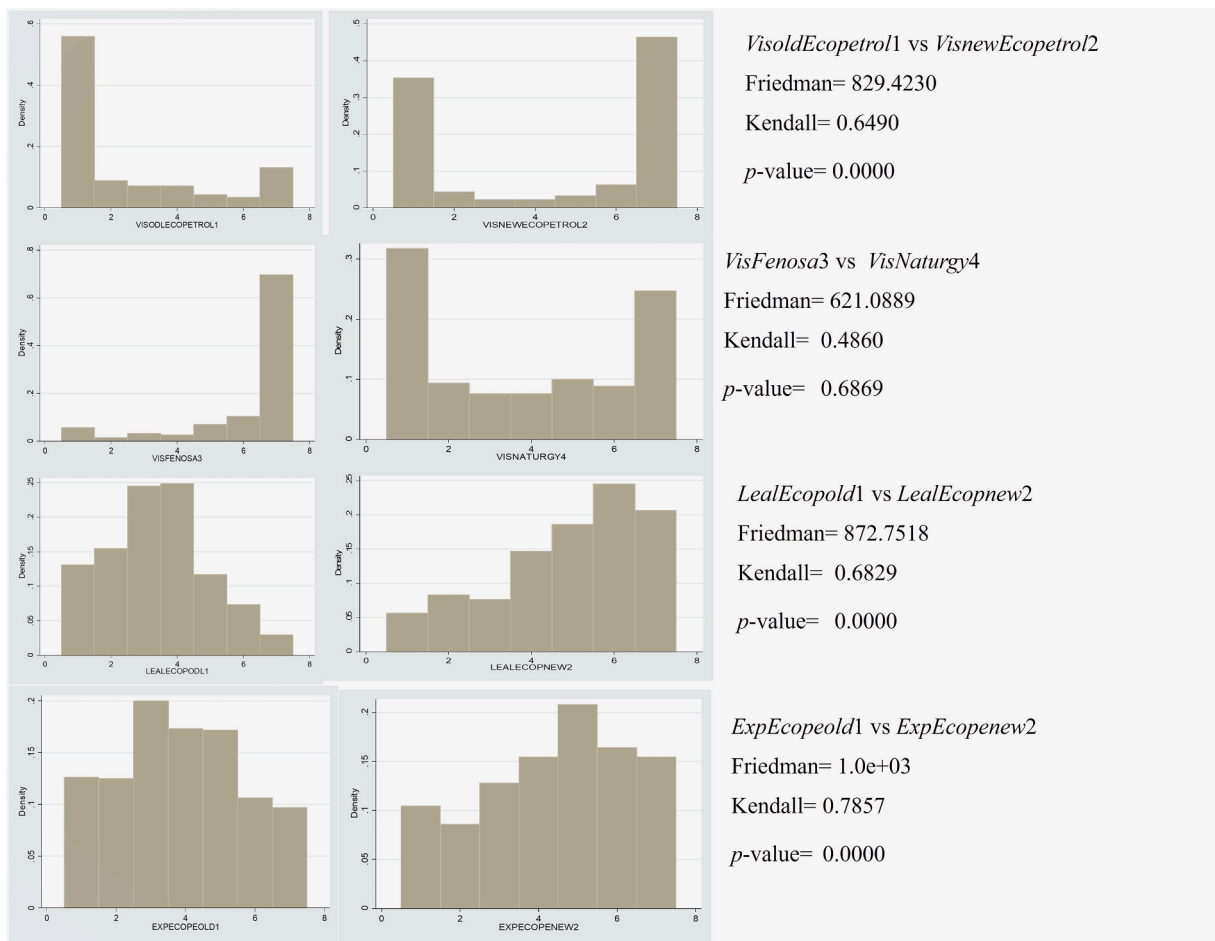


Fig. 4. Analysis of perceptions between conventional logos and «green» logos.

and the kurtosis value ranged from 1.18 to 6.21. It is worth noting that the asymmetry values were <3 and the kurtosis values were <10 , indicating that the research data conform to a multivariate normal distribution. This finding allows us to proceed with subsequent analyses (Kline, 2011).

The findings of the statistical analyses reveal that the sample size is adequate for statistical purposes, and the sample is randomly selected. Moreover, the sample is normally distributed. These factors enable the application of detailed statistical analyses and the development of structural equation models to determine if the variables Visibility, Loyalty, and Experience are appropriate for use in a model that measures brand value.

3.4.2. The measurement models

Confirmatory Factor Analysis (CFA) was used to assess the adequacy of the measurement model as well as to investigate the data before examining the structural relationships between the variables (Anderson and Gerbing, 1988). The measurement model included three latent variables—Visibility (VIS), Loyalty (LOYAL), and Experience (EXP)—and 15 observed variables (Fig. 5). The CFA allowed to show that the latent variables were freely correlated with each other, while the observed variables were specified to load only on their respective latent factors. The CFA result showed that the measurement model fitted the data well— $\chi^2 = 911.409$, $df = 640$, $X^2/df = 1.42$; $IFC = 0.90$; $TLI = 0.90$; $SRMR = 0.052$ (Wu, 2009; Muñoz-García and Villena-Martínez, 2020).

After the completion of the CFA examination, Cronbach's coefficients were determined to evaluate the internal consistency of the measures. The findings revealed that the Cronbach's coefficients of the scales fluctuated between 0.88 and 0.95, being above the threshold of

0.6 as specified by Loewenthal & Lewis (2020). A comprehensive summary of the standard factor loading of all items and the reliability estimates for the scales is presented in Table 4.

These statistical analyses show that: (1) the variables associated with Visibility, Loyalty and Experience are adequate to capture the perception of those surveyed about the value of the brand, since they present a Cronbach's α greater than 0.80. Given these data, it can be affirmed that the survey questions actually measured what has been conceptually defined as Visibility, Loyalty, and Experience. (2) CFI statistics = 0.90; TLI = 0.90, and SRMR = 0.052 allow progress in the formulation of a model of structural equations, which demonstrates that these variables are key or useful for measuring the value of the brand.

3.4.3. Structural model estimation

A SEM analysis was performed to test the hypothesized relationships between VIS, LOYAL, and EXP values. The analysis showed that the initial hypothetical model has a satisfactory fit to the data: $\chi^2 = 911.409$; $df = 640$; $X^2/df = 1.42$; $IFC = 0.9$; $TLI = 0.9$; $SRMR = 0.052$. Subsequently, the statistical significance of the path coefficients between the variables was explored. The paths from Visibility (VIS) to Loyalty (LOYAL); from Visibility (VIS) to Experience (EXP); and from Loyalty (LOYAL) to Experience (EXP) are statistically significant. Fig. 6 present the SEM results of the model.

The effect of Visibility (VIS) on Experience (EXP) was $\beta = -0.13$ ($p < 0.05$), the effect of Visibility (VIS) on Loyalty (LOYAL) was $\beta = 0.31$ ($p < 0.05$), and the effect of Loyalty (LOYAL) on Experience (EXP) was $\beta = 0.67$ ($p < 0.05$). Therefore, the hypotheses H_1 —Visibility (VIS) has a significant positive influence on Loyalty (LOYAL)— and H_2 —Loyalty (LOYAL) has a significant positive influence on Experience (EXP)— are

Table 3
Descriptive Statistics of the Survey Items.

ID	LABEL	Average	Standard deviation	Skewness	Kurtosis
1	VIS1	2576	2191	1079	2615
2	VIS2	4381	2775	0,267	1182
3	VIS3	6142	1664	2077	6219
4	VIS4	3803	2440	0,110	1376
5	VIS5	2865	2018	0,664	2083
6	VIS6	3132	2230	0,506	1743
7	VIS7	3823	1898	0,008	1894
8	VIS8	3339	1891	0,274	1901
9	VIS9	3501	2354	0,256	1488
10	VIS10	3273	2074	0,429	1849
11	VIS11	4217	1927	0,188	1896
12	VIS12	4809	1861	0,624	2343
13	VIS13	5060	1586	0,700	2916
14	VIS14	3662	1802	0,133	2039
15	LEAL1	3404	1540	0,525	2508
16	LEAL2	4884	1777	0,642	2421
17	LEAL3	5107	1571	0,827	3161
18	LEAL4	4218	1618	0,287	2319
19	LEAL5	4262	1671	0,187	2250
20	LEAL6	4171	1658	0,175	2142
21	LEAL7	4945	1521	0,729	3016
22	LEAL8	4723	1534	0,510	2661
23	LEAL9	3520	1687	0,226	2226
24	LEAL10	4939	1794	0,686	2415
25	LEAL11	5206	1492	0,887	3436
26	LEAL12	4293	1649	0,317	2317
27	LEAL13	4231	1832	0,214	1993
28	LEAL14	4254	1795	0,240	1996
29	LEAL15	5003	1547	0,761	2937
30	LEAL16	4710	1575	0,558	2672
31	EXP1	3845	1813	0,092	2043
32	EXP2	4385	1877	0,314	2047
33	EXP3	4689	1681	0,490	2447
34	EXP4	4056	1670	0,141	2248
35	EXP5	4337	1676	0,189	2271
36	EXP6	4573	1654	0,382	2354
37	EXP7	4795	1577	0,608	2828
38	EXP8	4617	1615	0,494	2657
39	EXP9	3450	1603	0,343	2509
40	EXP10	4920	1775	0,606	2378
41	EXP11	5185	1518	0,853	3374
42	EXP12	4354	1640	0,319	2354
43	EXP13	4200	1734	0,185	2115
44	EXP14	4204	1717	0,207	2188
45	EXP15	4939	1570	0,772	3039
46	EXP16	4650	1567	0,503	2662
47	EXP17	3878	1746	0,043	2054
48	EXP18	4037	1873	0,078	1921
49	EXP19	4565	1697	0,473	2407
50	EXP20	4064	1663	0,132	2233
51	EXP21	4101	1639	0,109	2300
52	EXP22	4400	1663	0,164	2302
53	EXP23	4564	1605	0,350	2482
54	EXP24	4437	1614	0,365	2469
55	EXP25	3368	2247	0,286	1542
56	EXP26	2939	2053	0,636	2031
57	EXP27	3734	1981	0,107	1809
58	EXP28	3806	1769	0,035	2077

Source: Authors.

*Note: The label corresponds to the item that have been referenced in Table 1.

supported, while H_3 —Visibility (VIS) has a significant positive impact on Experience— is not supported. This means that the latent variables VIS, EXP and LOYAL present statistical relationships, which confirms that they are suitable for inclusion a model that allows measurement of brand value under the influence of perceptions and messages of sustainability.

Finally, a *bootstrap* analysis was performed to test the mediating relationships in the causal chain of the model. The results revealed that *Visibility (VIS)* (indirect effect = 0,004, $p < 0.05$) produces an indirect effect through *Loyalty (LOYAL)* on *Experience (EXP)*. *Experience (EXP)* (indirect effect = 0,041, $p < 0.05$) shows an indirect effect through

Loyalty (LOYAL) on *Visibility (VIS)*. This confirms H_4 , namely that *Visibility (VIS)* *Loyalty (LOYAL)* and *Experience (EXP)* are related and have a significant contribution in determining brand value (see Table 5).

3.5. The brand equity model based on customer perception

Based on the findings of the research, it can be asserted that the variables *Visibility (VIS)*, *Loyalty (LOYAL)*, and *Experience (EXP)* can be used, with a confidence level of over 95 %, as effective indicators for measuring brand value in terms of environmental sustainability. Furthermore, it appears feasible to develop a BE model that builds upon existing ones, but also incorporates perceived CSR and its role in brand value. This model seems particularly relevant for companies in the energy sector, as were evaluated in this study. In summary, brand value that includes CSR can be reliably quantified using the contingent variables *Visibility (VIS)*, *Loyalty (LOYAL)*, and *Experience (EXP)*.

$$\text{Brand Value} = f + \text{VIS} + \text{LOYAL} + \text{EXP}$$

Where:

Brand Value= It is the brand value of brand i VIS = It is the result of the *Visibility* estimation

LOYAL = It is the result of the estimation of *Loyalty* EXP = It is the result of the estimation of *Experience* f = Express the function that groups and defines these elements

According to the BE model proposed by us, greater brand value in relation to social and environmental sustainability can be expected when:

1. The *Visibility* of information (logos and mission objectives of the brands) on CSR and sustainability is perceived clearly and unambiguously by consumers. >77 % of those surveyed expressed greater brand acceptances when its logo contained specific «green» messages or mentions of «sustainability».
2. Consumer *Experience* with the brand reflects an acceptance and positive perception of a company’s commitment to CSR and sustainability actions. Consumers express an 80 % fulfilment of the *Experience* variable when a brand or its logo have an explicit relationship with CSR and sustainability. In addition, customer experience with the brand increases to 87 % when a company’s mission objectives contain explicit reference of CSR.
3. Consumer *Loyalty* for a brand increases to 70 % when companies make it evident in their advertising and communications that CSR and sustainability are real commitments as evidenced by congruent actions. Loyalty to the brand increases further to 77 % when the mission objectives of brands make CSR their central focus.

The successful use of Structural Equation Models (SEM) validates the approach of determining brand value through the measurement of multiple latent variables of customer engagement including their perceptions of Corporate Social and Environmental Responsibility. Our findings indicate that increased brand *visibility* is positively associated with enhanced *loyalty* and improved consumer *experience*, ultimately resulting in higher brand value. Likewise, a better consumer *experience* leads to greater brand *loyalty* and *visibility*.

The confirmation that hypotheses H_1 , H_2 , and H_4 are valid indicates that *Visibility*, *Loyalty*, and *Experience* are appropriate, informative and robust indicators of *brand value* that can be quantified with confidence in extensive surveys like the one conducted here. This provides a systematic approach and practical tool that could be replicated in future efforts to measure brand value in other economic sectors and contexts, for example, for assessing social responsibility and gender equity, and how people’s cultural values shape their social, economic or environmental attitudes and preferences.

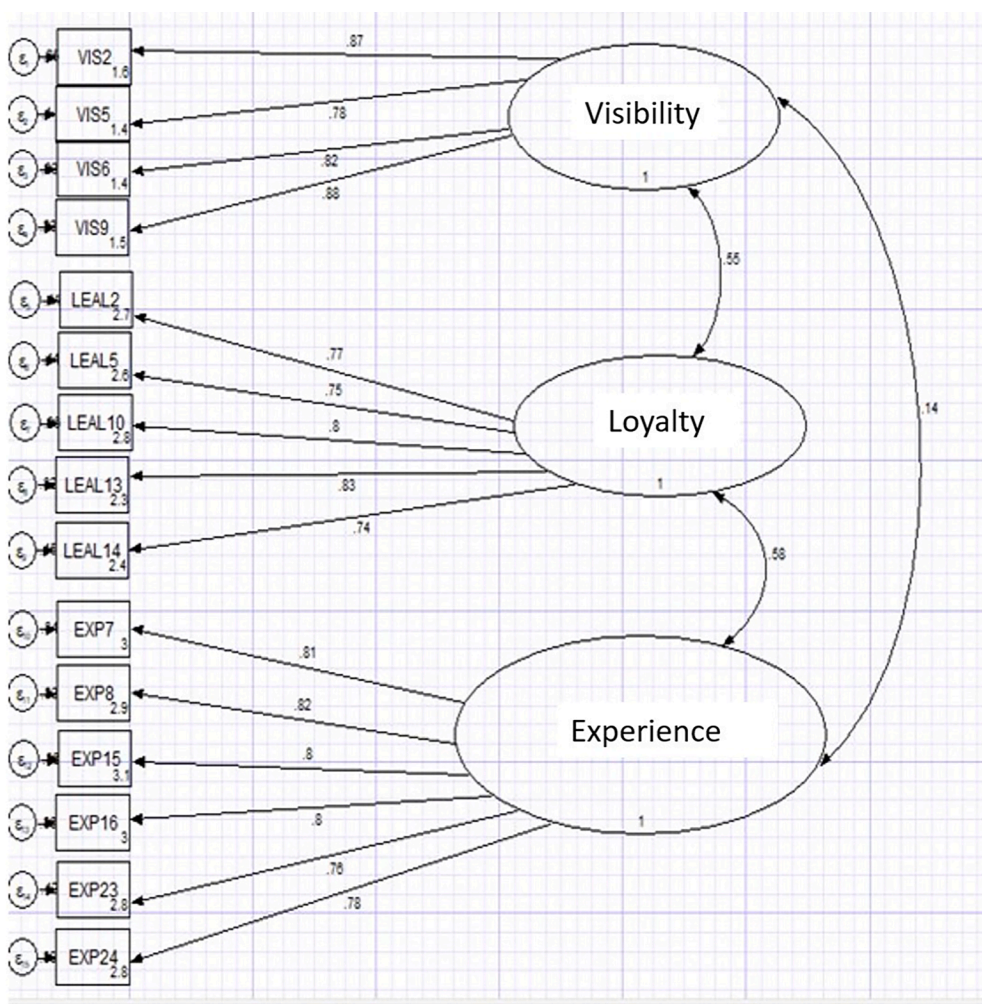


Fig. 5. Results of the confirmatory factor analysis (CFA) of three factors of the measurement model.

Table 4
Standard factor loading of the items and the reliability of the scales.

Latent variables	Ítems	Factor Load	Cronbach's alpha
Visibility [VIS]	VIS2	0,87	0,88
	VIS5	0,78	
	VIS6	0,82	
	VIS9	0,88	
Loyalty [LEAL]	LEAL2	0,77	0,92
	LEAL5	0,75	
	LEAL10	0,8	
	LEAL13	0,83	
	LEAL14	0,74	
Experience [EXP]	EXP7	0,81	0,95
	EXP8	0,82	
	EXP15	0,8	
	EXP16	0,8	
	EXP23	0,76	
	EXP24	0,78	

Source: Authors.

3.5.1. Final considerations

Traditional methods for gauging brand value may take the form of theoretical or empirical models, which may be single-dimensional or multidimensional, emphasizing either economic factors or consumer perceptions of a product or service. However, few studies have treated «brand perception» as a latent variable that is time-dependent and subject to trends in the general cultural ecosystem. This limitation

undermines the measurement accuracy, as current trends can change brand perception and the efficacy of specific marketing actions toward the public, as exemplified by the different customer appeals of the other logos analyzed in this study. Thus, it is reasonable to inquire: How can brand value be reliably assessed unless current customer sensibilities and cultural trends are incorporated?

Once this gap in was established, it was crucial to identify a suitable model for assessing the impact of CSR on brand value. Central to the study's methodology was the fact that both companies underwent changes in their logos, respective mission objectives, and communication strategies, which seemed to affect their overall brand image. The model that emerged from the analysis was based on consumers' responses to questions related to the effect of visual stimuli, in particular, different versions of the company's logos and mission objectives and logos, which represented different moments in the history of the respective brands. One brand, Ecopetrol S.A., had not initially considered CSR in its branding, while the other, Naturgy, had. It was enlightening to observe the respondents' distinct reactions to the old, conventional and new, «green» logos. which significantly affected the degree of brand preference and acceptance.

The significant correlation between brand *Visibility* and CSR leads to robust consumer responses on the Likert scale, which ranges from 65 % to 100 %. Both the messages conveyed and the meaning of the «green» content in the logos impact the brand's perception and, consequently, its visibility.

In terms of *Loyalty*, robustness is between 91 % and 100 %, and

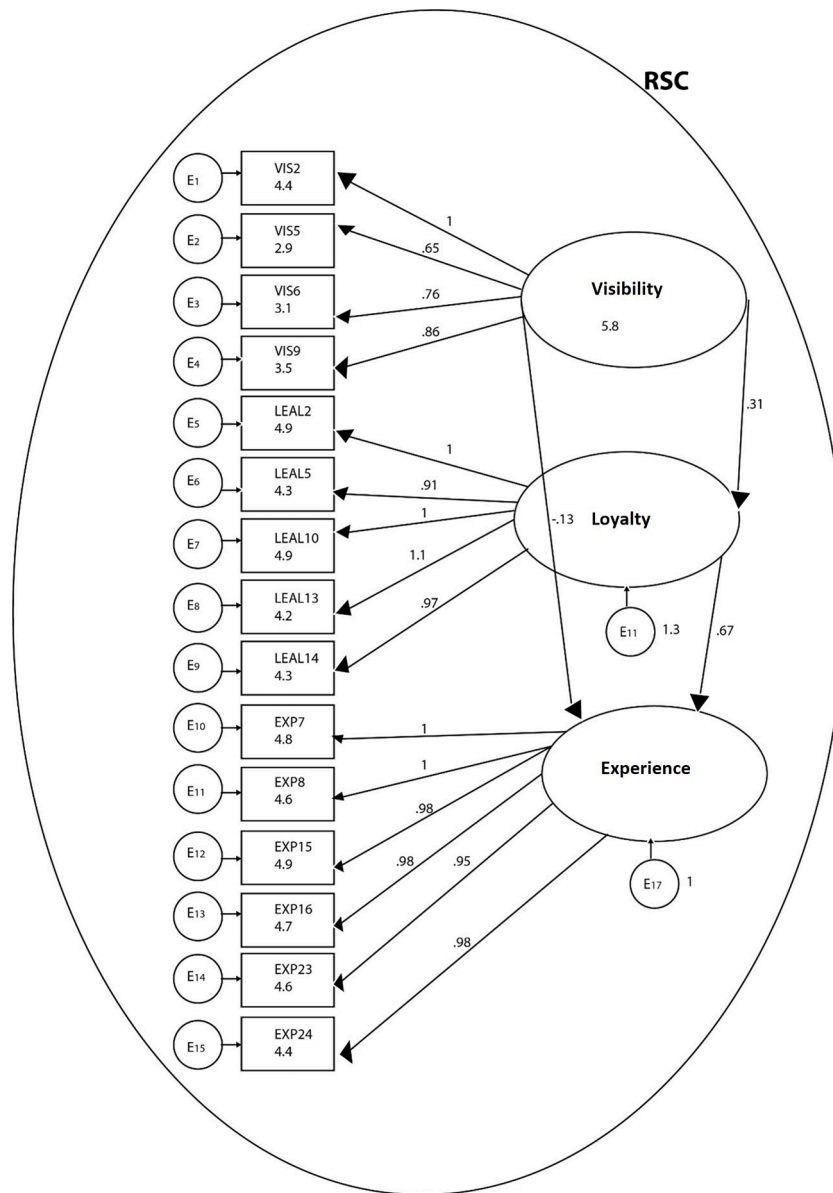


Fig. 6. Results of the structural equation model.

Table 5
Mediation test using bootstrapping.

Paht	Bootstrapping		95 % Bias-Corrected CI		p Value
	Efecto indirecto	Boot S. E.	Boot LLCI	Boot ULCI	
VIS – LEAL – EXP	-0.004	0.002	-0.011	-0.001	0.027
EXP – LEAL – VIS	0.041	0.013	0.072	0.019	0.000

Source: Authors.

«green» content and CSR also influence this perception. This also holds true for the Experience variable, which has a robustness of 95 % and 100 %, and is positively impacted by the relationship between «green» messages and content. Although the research produced very reproducible statistical results, it is worthwhile to mention several observations made when analyzing the data:

Respondents are primarily visual in nature, as the initial perception of a company’s CSR is often shaped by their response to the visual content of its logo. This is demonstrated by our results showing

significantly different visual appeal of «green» and «non-green» logos, as confirmed by Friedman’s test. This high visual susceptibility is conducive to the practice of greenwashing, where companies may use environmental imagery in their logos to create a positive public perception of their CSR efforts, even if their actual practices are not as sustainable or responsible.

However, it is only when respondents are presented with the «green» versus «non-green» mission objectives of each company that their perception aligns with brands that convey sustainable or green messages. That is, when a respondent views the logo and then focuses on the text of the mission objectives, they are able to better articulate their preference for brands that explicitly address environmental concerns.

It is significant that the new Ecopetrol S.A. logo evokes a greater acceptance among survey participants than the new Naturgy logo, despite both companies utilizing colors and images that suggest naturalness and sustainability. The reason for this may lie in the fact that the Ecopetrol logo is more striking in its overall design, featuring an aesthetically presented iguana that is intertwined with the company’s acronym, symbolizing harmony with nature and evoking a sense of protection and care for the environment consistent with the survival of

species. In contrast, the Naturgy butterfly logo is more abstract and less visually striking, with less explicit messaging or symbolism related to CSR objectives.

It is important to bear in mind that a sizable proportion of the respondents, amounting to 75 %, possessed a prior understanding of corporate social responsibility (CSR) principles. Furthermore, they exhibited prior awareness of the ramifications of being a socially and environmentally responsible brand.

3.6. Communications and greenwashing

Upon analyzing the respective brands for evidence of persuasion, misleading statements, greenwashing, and surreptitious advertising, it is evident that both companies utilize suggestive images that evoke nature and «eco» messages of supposed sustainability. In this respect, Ecopetrol S.A. goes further in its attempts to project an environmental virtue or «goodness» of its products and services, employing statements that bear little resemblance to its routine operations. For instance, it exalts green products and symbols whereas its main products are oil and gas which do not appear in its logo. Naturgy also associates its brand with nature, but is less explicit visually, complementing its logo with mission statement terms such as «clean», «green», «responsible», «natural», «recyclable», «sustainable», and other similar expressions. Ecopetrol's verbal messaging goes further by explicitly including terms such as «clean diesel», «clean barrels», «clean fuels», «better diesel for clean air», or «efficient and ethical barrels» in its mission statement and stating that «we work for a country taking care of the planet». Ecopetrol also claims to offer an «energy guarantee for the future», further accompanied by manifestations such as «let's use our energy to build a country of all and for all» and comparing a treatment plant with a shrub (plant), stating that «they both give us better air». Ecopetrol's advertising thus tries to influence consumers perceptions by assuaging their environmental concerns and playing down negative environmental impacts while suggesting responsible, sustainable production, which are not representative of its current practices. In contrast, Naturgy's mission statement refrains from articulating overly explicit environmental commitments that might elicit inquiries. In a succinct manner, it asserts that its objectives encompass: facilitating energy, maximizing societal well-being and growth; fostering innovation; enhancing energy efficiency; and finally, promoting sustainability.

Advertising known as «greenwashing», «greening» or «eco-whitening» employs natural imagery and organisms that consumers associate with sustainability, despite not actually delivering on it (Szabo and Webster, 2020). In their semiotic messaging, Ecopetrol S.A. and Naturgy utilize similar tactics, as they carefully craft and structure language, images, and aesthetics to convey a sustainability message to their target audience. The «representamen» (the sign), the object, and the interpretant (the way the object acts in the mind of the person) all play a role in this process. With regard to the dynamic objective (DO), it is clear that the former is represented by the «iguana» symbol in the case of Ecopetrol S.A. and the «butterfly» image in the case of Naturgy, including their specific characteristics, meanings, and messages. The indirect objective (IO), on the other hand, represents the way the isotype is portrayed, which is necessary to promote the corporate concept and values. Naturgy's «butterfly» isotype, for example, combines the previous colors of yellow and red to create orange, which is associated with energy. Additionally, the abstract outline of the «butterfly» alludes to the previous isotype of Unión Fenosa.

The primary objective of advertising is to influence the target population through a specific sign or representation, which is referred to as the indirect objective or «interpretament» (Peirce and Vericat, 1988). This is achieved by dematerializing the product and transforming it into a symbol that represents something else. In this sense, both Ecopetrol and Naturgy have successfully dematerialized their objects, such as the iguana and the butterfly, respectively, by stripping them of their generic characteristics and imbuing them with new ones. This is the essence of

advertising, which seeks not only to promote products to satisfy needs, but also to pursue other objectives such as conveying ideas, concepts, or economic values. For instance, Ecopetrol S.A. reported annual revenues of USD 4.093 billion (Ecopetrol, 2024) and Naturgy USD 141,020 billion (Naturgy, 2024), respectively. This represents a significant development for Ecopetrol S.A., since establishing itself as an international shareholding company, allowing it to expand its oil production activities, venture into the electricity and sustainable energy sectors. On the other hand, Naturgy's brand has been consolidated for many years, which has resulted in a strong and consistent image in the market. In recent years, Naturgy has continued to invest in renewable energy sources, further solidifying its commitment to sustainability and environmental responsibility. In both cases, the re-imaging of the company's logos and advertising to include elements of CSR appear to have enhanced brand value, recognition and acceptance among customers and investors.

4. Conclusion

Many authors, through very particular studies and variables handled in their theoretical or pragmatic models, such as Gao & Shen (2024) express the importance of the sensory experience of the brand, because it induces customer behavior, and suggests implementing strategies such as: (i) visual elements: use of colors, logos, logosymbols, specific images, that generate a strong impression in the minds of consumers; (ii) auditory elements: music, sound effects; (iii) taste items: for products and services, such as food, beverages, or food services; (iv) haptic elements: since tactile elements —weight, temperature, texture— can positively impact the experience and perception of consumers and (v) brand environment: it means creating a brand in a physical environment appropriate to the brand and its significance. Castro-Gómez et al. (2024) and Vuong & Bui (2024) in turn identify that the implementation of sustainability and CSR influence the perception of the brand, and confer attributes with respect to reputation. Calderón-Fajardo et al. (2023) focuses on the analysis of brand personality. Shrestha et al. (2023) based on the theoretical framework of Keller (2003) and Aakar's Customer-Based Brand Equity (CBBE) models, concludes that the Product Features (PF) generate Brand Awareness (BA), Brand Preference (BP), Brand Image (BI) BI is not sufficient in creating BL (brand Loyalty) and Brand Repurchase (BR) Overall, the survey-based result shows that marketing programs are the stimuli for creating BE. Ricciardone & Danesi (2023) and Danesi (2024) highlight as determinants, the role of communications and advertising, in the construction and change of attitudes, lifestyles and in the target market, while many studies do not, see them as simple elements, which accompany logos, logos, and symbols, but without greater significance, because they value images more. Finally, there are empirical approaches on how Brand Activism (BA), which refers to the fact that they address political and social issues, is a very recent focus of analysis due to the lack of tools to measure it (Saracevic and Schlegelmilch, 2024).

Of the 31 models focused on consumers, costing, financial and market, qualitative pragmatic and quantitative theoretical models, each with a model; the mixed theoretical ones - qualitative and quantitative - four; the pragmatic mixed six; the theoretical qualitative with eight and the pragmatic quantitative with 11 models. With respect to consumer-focused models, there are eight pragmatists and 13 theoretical models.

With the above panorama and having that a quantitative model with the proposed variables logosymbols, communications, advertising, CSR, rebranding, greenwashing, as well as certain elements of logo symbol semiotics is not reported, it was what led to make its initial formulation, and corresponds to the tendency to adopt quantitative methods, to achieve a better approximation and certainty in their results in the field of advertising.

The analysis with Structural Equation Models (SEM) leads to affirm that there is sufficient evidence to validate a model that allows measuring brand value, based on the latent variables described, with a systemic approach and CSR and Environmental Responsibility.

The greater the visibility, the greater the loyalty and the better the consumer experience, which consequently increases brand value. Similarly, with a better consumer experience, loyalty improves with visibility.

Hypotheses H_1 , H_2 , and H_4 are supported, showing that Visibility, Loyalty and Experience are variables that can be measured through surveys such as the one developed by the present investigation, thus generating a tool that can be replicated in the future and used in other efforts to measure brand value for other economic sectors, with a systemic approach and for other types of trends, such as CSR and the gender equity approach, and the influence of culture and values on various social, economic, or environmental aspects.

The current study contributes new insight into the development and re-design of a brand through the utilization of appropriate logos and implicit messages, as well as assessing the broader validity of this strategy. Specifically, it aims to enhance the understanding of BE with a particular focus on how to measure and enhance it. This research is in line with the prevailing view that many aspects associated with trademarks can and should be in line with applying more quantitative methods, which lead to achieving greater certainty of the desired results.

Consumers are not consistently rational in their decision-making processes. Rather, they tend to be influenced by emotions and needs, as well as a propensity for self-satisfaction. It is crucial to recognize that these factors are not static but rather time-variable and can be modulated effectively by appropriate external influences. For instance, culture plays a significant role in shaping the meaning and significance of products, allowing them to be endowed with additional social and psychological significance. In the end, these factors can drive changes in consumer choices and in society as a whole.

Our study of the CBE scale measurement provides significant theoretical contributions across various facets. At its core, our research enhances the understanding of BE by integrating consumer perception into assessing competitive brand performance at the corporate level. This integration is a relevant departure from traditional approaches, offering a novel perspective in BE literature and being the first attempt to develop a comprehensive corporate BE measurement model. Corroborates a trend that seems to have occurred since the mid-20th century, in that companies have become aware that they sell not only tangible products but also an image, so it is crucial to be aware of the messaging involved. In the allusion to nature in their company logos, both Ecopetrol and Naturgy have embraced symbols that detract from their true activity (energy generation) and suggest sustainability and harmony with nature, appealing to the current sensibilities of specific social groups and society in general, who have become increasingly aware of the adverse environmental impacts of energy generation and are demanding sustainable solutions. To remain relevant, corporate logos and messaging must evolve over time and avoid becoming outdated. Companies must reinvent their brands, much like narratives, by changing and adapting instead of remaining static. Ecopetrol S.A. and Naturgy have successfully updated their logos and messaging to include elements of corporate social responsibility (CSR) and sustainability without compromising brand value, as is evidenced by high customer visibility, loyalty, and experience. Both companies communicate a similar vision, mission, and values, with a stated commitment to CSR and an emphasis on environmental issues.

In their advertising, Ecopetrol S.A. and Naturgy utilize nature-related logos and messages in a predominantly sub-conscious and emotional fashion rather than a rational and explicit one. Yet, these approaches appear to be highly effective, as evidenced by the business strength and positive customer perception and acceptance of both companies. While Naturgy has largely avoided major environmental controversies, Ecopetrol S.A. has faced numerous concerns, particularly prior to 2003. Nonetheless, both companies have managed to update their image and message of environmental responsibility through redesigning their graphic identity. By utilizing distinctive logos with natural elements, they have achieved a distinct visual identity and

associated their brand with a perceived commitment to the environment and CSR. As such, both Ecopetrol S.A. and Naturgy logos have been successful in persuading and convincing their target audiences.

5. Limitations and future research

The following points highlight the limitations and future research efforts associated with the topic of brand value: (i) The survey concentrated on customer perception of global brands within an industry that has with significant visibility and socio-environmental sensitivity (mining and energy). To validate and generalize our findings it would be valuable to apply this methodology to economic sectors and brands of more regional and local significance; (ii) The survey was conducted on a primarily Western study population, so it is crucial to determine how these analyses would perform in other cultural contexts, such as Asian or Arab cultures; (iii) Moreover, it raises the question of how individuals with different educational backgrounds, experience, sensitivity and familiarity with the concept of Corporate Social and Environmental Responsibility would respond to the survey. It is conceivable that different study populations would be more or less receptive to the logo elements and their relation to CSR; (iv) Lastly, it is unclear whether a survey of customer perception that exclusively involved logo symbols or just the mission objectives would render comparable results.

Data availability

All data generated or analyzed during this study are included in this published article and its supplementary information files.

Ethical approval

This article does not contain any studies with human participants performed by any of the authors.

CRedit authorship contribution statement

María Margarita Gutiérrez: Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Juan José Perona-Páez:** Writing – review & editing, Validation, Supervision, Project administration. **Cesar Augusto Ruiz-Agudelo:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Francisco de Paula Gutiérrez - Bonilla:** Writing – original draft, Methodology, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.envc.2024.101032](https://doi.org/10.1016/j.envc.2024.101032).

Data availability

No data was used for the research described in the article.

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