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Consumer Judgment on the Practice of Greenwashing: Scale Development and Validation

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ABSTRACT

This study aimed to develop and validate a scale to measure consumer judgment about the practice of greenwashing. For this, quantitative research was adopted as methodological procedure, which was conducted through a statistical technique characterized as multivariate analysis. Thus, in a first step, theoretical studies and reports on the characterization and/or identification of greenwashing were surveyed and analyzed, which allowed for the adoption of six main dimensions that were evidenced in a common manner. From these dimensions, some assertions were elaborated and reviewed by a jury of experts, validating the data collection instrument. With this done, two sequential quantitative surveys were conducted: the first with 381 respondents, which allowed the exploratory factor analysis to be performed, and the second with 156 participants, enabling the confirmatory factor analysis to be performed using the structural equation modeling technique. As a contribution, a satisfactory final model composed of 13 assertions was obtained.

KEYWORDS

Greenwashing. Greenwashing Scale. Exploratory Factor Analysis. Structural Equation Modeling. Consumer

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1. INTRODUCTION

With the growing trend of environmental concern, and the demand for environmentally friendly attitudes by the business community, many organizations have found themselves unprepared to compete in this new scenario. Thus, in their eagerness to take advantage of the benefits of conveying a green image to the to the consumer market, some organizations ended up publicizing environmental appeals that did not necessarily match their practices (Budinsky & Bryant, 2013). By anchoring themselves to a deceitful discourse about their environmental practice - without any practical backing - organizations are practicing what is conceptualized as greenwashing (Andreoli, Crespo & Minciotti, 2017).

In this sense, the greenwashing action is characterized when the organization uses any attribute, or highlights any benefit, directed at the environment and/or the environmental issue, but fails to prove the veracity of it (Nyilasy et al., 2014; Andreoli & Batista, 2020). The discussion about greenwashing gains strength and becomes increasingly worrying with the evidence that many of the environmental actions disclosed by organizations, with their due media backing, have no real proof (Jahdi & Acikdilli, 2009; Andreoli, Lima & Prearo, 2017).

Despite this, there are still few publications focused on discussing the practice of greenwashing (Andreoli, Lima & Prearo 2017; Costa, 2020), and even scarcer are those that focus on the characterization of criteria that allow for the identification of greenwashing (Lyon & Montgomery, 2015; Andreoli & Batista, 2020). Until the time of this research, no references related to the aforementioned were found in the academic universe, and there is also no scale to measure this theme.

The only scale that bears some resemblance to the theme is that which was developed by Mohr et al. (1998), which deals with consumer skepticism in relation to environmental appeals used by organizations. However, this is a scale with only four assertions, which do not cover all the dimensions related to the various possibilities of greenwashing practices by organizations. Still, it should be argued that this scale addresses the more specific concept of skepticism; thus, it does not include measurement variables about the opinion and judgment that consumers make about the practice of adopting green appeals in organizational advertisements, nor, even less, does it identify them in relation to the practice of greenwashing by the organizational environment.

Non-academic publications are a bit more promising in relation to this investigation, having already surveyed the main characteristics involved in the practice of greenwashing, with the identification of the main actions performed by the organizational environment. Among these, three main ones stand out, which will serve as a basis for the development of this study: Terrachoice (2010), Futerra (2009), and the Greenwashing Index (2016). It is noteworthy that these efforts did not result in a scale of identification or measurement of the practice, nor did they provide the detection of the opinion or judgment of consumers about greenwashing.

In this sense, this study aimed to develop and validate a scale to measure consumer judgment about the practice of greenwashing. This effort will enable an unprecedented understanding of the consumer market's reaction to the practice of greenwashing. Considering the current context of proliferation of the greenwashing practice, the role of the consumer as a possible agent of regulation and inhibition is praised: as the final point in the production chain, they play an important role as questioner and demander of changee (Andreoli & Minciotti, 2019; Andreoli & Batista, 2020; Jong et al., 2020).

To this end, quantitative research was adopted as the methodological procedure, conducted through a statistical technique characterized as multivariate analysis. Thus, in a first step, theoretical studies and reports on the characterization and/or identification of greenwashing were surveyed and

analyzed, which allowed the adoption of six main dimensions that were evidenced in a common manner. From these dimensions, some assertions were elaborated and reviewed by a jury of experts, validating the data collection instrument. With this done, two sequential quantitative surveys were conducted: the first with 381 respondents, which allowed the exploratory factor analysis to be performed, and the second with 156 participants, enabling the round of confirmatory factor analysis through the structural equation modeling technique.

2. GREENWASHING

The term greenwashing draws its origins from the expression "whitewash", which refers to the process of hiding one's mistakes in order for one's reputation to remain clean. In this way, the term greenwashing characterizes the "greenwashing" of products or the organization itself, so that they seem ecologically correct without actually being so (Andreoli, Crespo & Minciotti, 2017).

In this sense, Parguel et al. (2011) are more emphatic in conceptualizing greenwashing as an advertising action capable of promoting a process of misinformation, an intentional act to confuse consumers with false claims about the environmental stance of organizations, making up the product or the organizational image. Thus, greenwashing is not conceived as a mere ambiguous or mistaken practice, but as, in fact, unreal and irresponsible (Andreoli & Batista, 2020).

The practice of greenwashing is present in many different media formats, from product labeling to final communications, which multiplies its possibilities of occurrence (Lyon & Maxwell, 2011; Correa et al., 2018). There are several possible consequences of this, discussed below.

First, there is a proliferation of cases identified as greenwashing, from those with lower levels of evidence to those with more alarming degrees of evidence (Andreoli, Lima & Prearo, 2017; Correa et al., 2018). There are increasingly recurring cases reported in the media about the detection of organizational practices in this sense, highlighting even brands with consolidated reputations in the domestic market (see Ferreira et al., 2019, Andreoli & Bastista, 2020).

Second, there is a certain difficulty in defining the concept and, especially, the real configuration of greenwashing, since there is no clarity about its identification or its measurement (Lyon & Montgomery, 2015; Andreoli & Batista, 2020). If even specialized media and academia are faced with such difficulty, one can imagine the confusion that permeates the consumer market. Even the academic omission regarding this responsibility should be highlighted (Andreoli, Crespo & Minciotti, 2017).

Third, as confabulated above, this scenario creates a generalized confusion in the market, mainly before consumers, but also before other possible stakeholders (Lim et al., 2013; Braga et al., 2016). This confusion relates not only to the practice of greenwashing in fact, but it is capable of permeating the entire green market in general (Fialho & Marquesan, 2018; Braga et al., 2019).

Fourth, such confusion permeates not only the business sphere, but also the academic environment: on one hand, with profusion of definitions and conceptions, more or less similar and extended, as well as, on the other hand, there are several possibilities for research and investigation gaps (Andreoli, Crespo & Minciotti, 2017). Thus, recent studies advance in the search for an understanding by consumers when related to the theme greenwashing, emphasizing a supposed environmental concern in front of corporations, but with consistent gaps between the corporate speech and corporate practice (Costa et al., 2020; Andreoli & Batista, 2020; Jong et al., 2020). As a rule, it becomes essential to understand the consumers' insights about the environmental practices adopted by organizations (Fialho & Marquesan, 2018; Braga et al., 2019). Again, it should be stressed that reinforcenot only is there a scarcity of studies focused on the practice of greenwashing, but, more worrying, there is an absence of academic publications concerned

with the characterization of criteria that would allow for the identification of the phenomenon (Andreoli & Batista, 2020; Ruiz-Blanco et al., 2021).

3. METHODOLOGICAL PROCEDURES

To meet the proposed objective, this study adopted quantitative research as its methodological procedure, conducted through a statistical technique characterized as multivariate analysis. Multivariate analytical techniques have become important tools for analyzing government, industrial, and academic research, mainly due to the possibility of reducing the degree of subjectivity in the evaluation of data collection instruments (Hair et al., 2005).

Thus, in a first step, theoretical studies and reports on the characterization or identification of greenwashing were surveyed, analyzing the different dimensions suggested by them. Based on this, it was possible to arrive at six main dimensions of greenwashing, which were evidenced in a common way, also allowing the elaboration of some assertions for each dimension. These assertions were reviewed and validated by a jury of experts, composed of two professors who are researchers on themes related to sustainability and consumption, both active in stricto sensu programs recognized by Capes, one from the University of São Paulo (USP) and the other from the Municipal University of São Caetano do Sul (USCS).

In a second moment, two sequential quantitative surveys were conducted, as recommended by Hair et al. (2019): the first with 381 respondents, which allowed the execution of the exploratory factor analysis, and the second with 156 participants, enabling the round of confirmatory factor analysis through the structural equation modeling technique. In both cases, the sample was non-probabilistic, chosen by convenience, and with online data collection. The data collection instrument was composed of the respondent's profile (sex, gender and age) and assertions related to greenwashing, which were presented randomly to each participant, who was asked to respond about the level of agreement on a scale from 0 to 10, with 0 being totally disagree and 10 being totally agree.

The application of the Exploratory Factor Analysis technique becomes evident to summarize the amount of information present in the study, thus reducing the number of variables in a smaller grouping with the presence of new factors (Hair et al., 2009; Hair et al., 2019). In addition, it becomes possible to understand how much of the variance of a variable can be shared with another variable corresponding to the same factor, also enabling the elimination of variables that cannot be grouped (Hair et al., 2009; Hair et al., 2019).

To do so, a number of assumptions must be met (Hair et al., 2009; Prearo et al., 2011; Hair et al., 2019), such as those regarding the Kaiser-Meyer-Olkin (KMO), Bartlett's Sphericity, Mensure of Sampling Adequacy (MSA), and communality tests, as well as regarding multivariate normality of the data, minimum sample size, and total variance explained. These assumptions are presented and discussed in the following section. The extraction method adopted was the Principal Component method and the factor retention method was the Varimax rotation, minimizing the number of variables with high factor loadings on the same factor (Malhotra, 2012).

Subsequently, with the best result found from the Exploratory Factor Analysis, Confirmatory Factor Analysis was performed using IBM SPSS AMOS (Analysis of Moment Structures) software, using the Maximum Likelihood (ML) estimation method. Confirmatory Factor Analysis is the most direct method for validating the results obtained from the Exploratory Factor Analysis and then evaluating the repeatability of the results (Hair et al., 2005; Hair et al., 2019). Thus, it is configured as a broader technique, in the context of multivariate analytical techniques, also called Structural Equation Modeling based on Covariance - MEE-BC (Hair et al., 2005; Hair et al., 2019).

In this sense, a satisfactory Confirmatory Factor Analysis must fulfill nine steps, namely: choosing the data matrix to be used, the estimation method, checking the model identification, finding any discrepant estimates, assessing the overall fit of the model, quantifying the fit of the measurement model, assessing the fit of the structural model, assessing the normalized residual matrix, and analyzing the standardized estimates (Lopes, 2005; Santana et al., 2016; Hair et al., 2019). The authors argue that these nine operations are necessary to eliminate possible variables that do not meet the indicators established as parameters.

4. SCALE DEVELOPMENT AND QUALITATIVE VALIDATION

Three studies found in non-academic publications were used as a basis for the development of the greenwashing practice judgment scale, which are detailed below: Terrachoice (2010), Futerra (2009) and the Greenwashing Index (2016). Such choices are justifiedfirstlyby the absence of academic studies in this sense, as exposed by Andreoli, Crespo and Minciotti (2017), who conducted a bibliographic survey and critical analysis of the academic production related to the theme of greenwashing. Second, they are justfied by the expressiveness of such reports, not only in the organizational environment, but also in the academic sphere, being used as references by the convenient literature. Among those cited, there is a report prepared by Terrachoice that lists what is conceptualized as the "sins of greenwashing" (Terrachoice, 2010). This report was found in several works, such as those by Chen and Chang (2013), Lyon and Montgomery (2013), Du (2015), Markham et al. (2014), Antunes et al. (2015), Pope and Waeraas (2016), and Correa et al. (2018). The report has three editions, having been prepared initially in 2007, when it grouped six sins, and was later extended to seven greenwashing sins in the 2009 and 2010 editions. Thus, the seven sins listed in the most recent edition are:

1. **Hidden trade-off:** also translated as a camouflaged environmental cost (Araujo & Aligleri, 2015), it refers to the action of highlighting a restricted set of environmentally favorable attributes, to the detriment of mentioning other environmental issues that are also important, but are not similarly positive in organizational practice. An example given is paper, which is not necessarily more environmentally friendly just because it comes from a sustainable forest, requiring other factors to be analyzed, such as energy, water and air pollution, among others.
2. **Lack of proof:** related to the use of environmental claims that cannot be supported by easily accessible information or reliable certification. An example given is fabrics that claim high percentages of post-consumer recycled content without providing any evidence.
3. **Imprecision:** This refers to claims that are defined so poorly or broadly that the true meaning is open to misinterpretation by consumers. The example cited refers to the term "100% natural", which may denote natural extraction processes, but which are not necessarily green, such as uranium and mercury.
4. **Irrelevance:** corresponds to the use of claims that, even if true, are not important or do not actually contribute to the environmental issue. As an example, we cite the frequent allegation of non-use of CFCs, as in the case of deodorants, but which is actually an action guaranteed by law (legal obligation).
5. **Lesser of two hells:** also translated as less bad (Araujo & Aligleri, 2015), relates to claims that are true but actually serve to distract consumers from the greater environmental impacts that the product category or even the organizational practice, specifically, entails. The study points to vehicles with higher fuel efficiency as an example

6. **Boasting false labels:** being the sin that was added in the 2009 and 2010 editions, it concerns products that use words or images that give the impression of endorsement by third parties, without this endorsement actually existing
7. **Lying:** although less frequent, this is relating to the use of claims that are simply false. The example given is products that falsely claim that they are certified or registered as energy stars.

Another publication consists of a business guide released by Futerra, in 2009, entitled "Understanding and preventing greenwashing" (Futerra, 2009). This guide was found as a reference in the works of Abdala, Guzzo and Santos (2010) and Pope and Waeraas (2016). This guide lists what is conceptualized as the 10 sins of greenwashing, exposed below.

1. **Fluffy language:** also translated as stylized language (Abdala, Guzzo & Santos, 2010), refers to the use of words or terms that do not have a clear meaning, such as "environmentally friendly" or "eco-friendly".
2. **Green products versus dirty organizations:** referring to environmentally correct actions, but when practiced by organizations that do not have an adequate environmental practice, such as efficient light bulbs produced by factories that pollute rivers.
3. **Suggestive pictures:** this refers to the use of green images that indicate, in an unjustified way, a certain green impact, such as flowers coming out of exhaust pipes.
4. **Irrelevant claims:** related to the emphasis given to some specific green attributes, when all the rest of the organizational practice is not green.
5. **Best in class:** also mentioned as the best among the worst (Abdala, Guzzo & Santos, 2010), relates to the statements of relative green superiority over the others, even if the rest performs very poorly on the environmental issue.
6. **Just not credible:** it mentions trying to "green" products that are simply harmful, such as eco-cigarettes.
7. **Jargon:** also understood as exaggerated language (Abdala, Guzzo & Santos, 2010), is related to the use of information that only scientists could understand or even verify.
8. **Imaginary friends:** corresponds to the use of labels that give the impression of having a third-party endorsement, but are something produced by the organization itself.
9. **Lack of proof:** related to the use of arguments that may even be correct, but no evidence is presented to prove them.
10. **Blatant lying:** concerning the use of invented claims or fabricated data.

It is also worth mentioning another publication, less known, which refers to the website Greenwashing Index, a cooperation between a consultancy called Environ Media and the University of Oregon, in the United States (Greenwashing Index, 2016). Mention of this publication was also found in the works of Abdala, Guzzo, and Santos (2010), Markham et al. (2014), and Pope and Waeraas (2016). This publication differs from the previous ones in that it is a survey of consumers, who must assign a score from 1 to 5 for some questions, with 5 being the worst, referring to more greenwashing, and 1 being the best, indicating less greenwashing. Thus, the publication has five main criteria, as well as thirteen sentences, prepared as questions, related to them. These criteria and their associated sentences are mentioned below.

1. The ad misleads with its words. Do you believe that the ad misleads people about the environmental impact of the organization or product through the things it says? Why are the words trying to make you believe there is a green practice when there isn't? Focusing on the words alone, what do you think the ad is saying?
2. The ad misleads with visual and/or graphic appeals. Do you think the advertiser used green or natural images as a way to make you think that the product or organization is more environmentally friendly than it actually is?
3. The ad makes a green claim that is vague or quite unlikely. Are the claims about environmental benefits made without sufficient support? Has the advertiser provided a source for these claims or for more information? Do the claims relate to the organization or the product?
4. The ad exaggerates how green the product or organization actually is. Do you believe the advertiser is exaggerating how green the product or organization actually is? Are the green claims believable? Do you think it is possible for the product or organization to actually do what they said?
5. The ad leaves out or masks important information, making the green claim seem better than it really is. Do you think the ad serves to distract attention from some other practice of the organization? Do you think the relevant side consequences of the products are considered in the ad? Does it seem that something is missing from the ad?

With the detail of these three reports, it was possible to compare them and identify six main dimensions that stood out in common, which are: ambiguity, limited environmental benefit, irrelevant information, lack of substantiation, false labels/figures, and false information (Table 1).

Despite the six dimensions in common in the three reports (Futerra, 2009; Terrachoice, 2010; Greenwashing Index, 2016), it is possible to observe the ambiguity and even duplicity not only of some assertions, but also of certain dimensions. Thus, it is understood that these dimensions are merely suggestive, not mandatory, contributing to facilitating the characterization of the phenomenon.

After arriving at six main dimensions of greenwashing, which were evidenced in a common way, it was also possible to elaborate some assertions for each dimension. These assertions were reviewed and validated by a jury of experts, composed of two professors, researchers of themes related to sustainability and consumption, both active in stricto sensu programs recognized by Capes, one from the University of São Paulo (USP) and the other from the Municipal University of São Caetano do Sul (USCS). The validation happened in two rounds, with notes directed more to spelling review. The result is shown in Table 2.

5. QUANTITATIVE VALIDATION

This section is divided into two parts: Exploratory Factor Analysis and Confirmatory Factor Analysis.

5.1. EXPLORATORY FACTOR ANALYSIS

The profile of the sample (n=381) was characterized by a superiority of female respondents (55.6%) and single (81.8%), with a mean age of 27 years (DV=11.51), ranging from 15 to 75 years. The sample had a high level of education, all being university students with undergraduate studies in progress or already completed.

Table 1
Comparison of the main greenwashing identification reports

Dimensions	Terrachoice (2010)	Futerra (2009)	Greenwashing Index (2016)
Ambiguity	3. Imprecision (poor or broad definition gives room for interpretation).	1. Soft language (words or terms without clear meaning). 3. Suggestive figures: use of green images that unjustifiably indicate a certain green impact. 7. Jargon (information that is difficult to understand or check). Induction to error with words.	1. Misleading with words. 3. Vague or highly unlikely green claim.
Limited environmental benefit	1. Hidden trade-off (specific green attributes at the expense of other important negative environmental issues). 5. Lesser of two hells (distraction with smaller true claims).	2. Green products versus dirty organizations (green actions practiced by organizations that do not have a green practice). 4. Irrelevant claims (specific green attributes when everything else in organizational practice is not green). 5. Best in class (relative green superiority when the rest is not green). 6. Just not credible (attempt to green products that are harmful).	1. Misleading with words. 3. Vague or rather unlikely green claim. 4. Exaggeration in promotion 5. Withholding or masking important information.
Irrelevant information	4. Irrelevance (information that is not important or does not contribute to the environmental issue).	4. Irrelevant claims (specific green attributes when everything else in organizational practice is not green).	1. Misleading with words
Lack of proof	2. Lack of proof: lack of support for environmental claims (information not easily accessible or lack of reliable certification).	9. Lack of proof: lack of support for environmental claims (information not easily accessible or lack of reliable certification).	1. Misleading with words 3. Vague or rather unlikely green claim. 4. Exaggeration in promotion.
False labels/ pictures	6. Displaying false labels (words or pictures that give the impression of third-party endorsement that does not exist).	3. Suggestive pictures: use of unjustified green images. 8. Imaginary friends: labels that give the impression of having a third-party endorsement, but it is something produced by the organization itself.	2. Misleading with visual and/or graphic appeals.
False Information	7. Lying (false claims).	10. Blatant lying (made-up claims or fabricated data).	1. Misleading with words. 3. A. Vague or rather improbable green claim. 4. Exaggeration in promotion. 5. Depriving or masking information.

Source: Prepared based on TerraChoice (2010), Futerra (2009), and Greenwashing Index (2016).

Table 2
Assertives developed and validated with the expert jury

Greenwashing	Assertives
Ambiguity	P1 - It is fairly easy for consumers to correctly interpret the environmental appeals used by organizations. P2 - The information conveyed by organizations about their green practice clearly demonstrate their environmental impact. P3 - The information conveyed by organizations about their green practice is always easily understood by consumers.
Limited environmental benefit	P4 - Environmental claims guarantee that products make a positive contribution to the preservation of the environment, regardless of the impacts generated in their process. P5 - The environmental benefits are completely assured when the product carries a green label.
Irrelevant information	P6 - Organizations never intend to confuse consumers with irrelevant information.
Lack of proof	P7 - Organizations always make available the proof about the environmental appeals adopted to consumers. P8 - Consumers are always able to understand the truth about the information contained in environmental claims.
False labels / pictures	P9 - The labels, seals, and green figures adopted in the products are a guarantee that the organization is concerned about the environment.
False information	P10 - The arguments highlighted in the environmental appeals used by organizations are true. P11 - Practically no organization conveys untruthful information about its environmental practices. P12 - There is no reason for consumers to doubt the environmental appeals used by organizations. P13 - Any and all green appeals used by organizations are truthful.

Source: Prepared by the authors and validated with expert jury (2017).

For factor analysis to be considered consistent, a series of assumptions must be met, as mentioned in the method. For the purposes of this study, the requirements were stipulated as follows: a minimum sample size of five participants for each variable; multivariate normality of the data; Kaiser-Meyer-Olkin (KMO) tests greater than 0.8; significant Bartlett's Test of Sphericity (less than 0.5); Mensure of Sampling Adequacy (MSA) greater than 0.7; communality greater than 0.4; and total variance explained greater than 0.5. (Hair et al., 2005, p. 98 and 101; Pestana & Gageiro, 2008, p. 329-330).

In the first round, a KMO of 0.953 ($p<0.001$) was obtained, with minimum values in all variables (MSA> 0.937 and communality >0.47), with 55.47% of the total variance explained. Below (Table 3) are exposed the extracted assertions along with their communalities (C) and the component matrix (MC).

With this done, we set out to validate the current model by means of Confirmatory Factor Analysis.

5.2. CONFIRMATORY FACTOR ANALYSIS

The profile of the sample (n=156) was characterized by a superiority of females (61.5%) over males (38.5%), with a mean age of 31 years, ranging from 15 to 66 years. The sample had a high level of education, with a predominance of post-graduation (57.1%), followed by complete

Table 3
Results of the Exploratory Factor Analysis

	Assertives	C	MC
P1	It is fairly easy for consumers to correctly interpret the environmental appeals used by organizations.	,466	,682
P2	The information conveyed by organizations about their green practice clearly demonstrate their environmental impact.	,570	,755
P3	The information conveyed by organizations about their green practice is always easily understood by consumers.	,519	,720
P4	The environmental appeals ensure that the products contribute positively to the preservation of the environment, regardless of the impacts generated in their process.	,475	,689
P5	The environmental benefits are completely assured when the product carries a green label.	,579	,761
P6	Organizations never intend to confuse consumers with irrelevant information.	,607	,779
P7	Organizations always make proof of environmental claims available to consumers.	,568	,754
P8	Consumers are always able to understand the truth about the information contained in environmental claims.	,514	,717
P9	The labels, seals and green figures adopted in the products are the guarantee that the organization is concerned about the environment.	,542	,736
P10	The arguments highlighted in the environmental appeals used by the organizations are true.	,514	,717
P11	Practically no organization conveys untruthful information about its environmental practices.	,616	,785
P12	There is no reason for consumers to doubt the environmental appeals made by organizations.	,598	,773
P13	Any and all green appeals used by organizations are truthful.	,644	,803

Source: Prepared by the authors (2020).

higher education (17.3%) and incomplete (14.3), and, also, only 11.5% with complete basic education. In relation to family income, the answers were concentrated in lower levels, with the majority between the first two income ranges, up to R$2,448 (40.4%) and from R$2,489 to R$6,220 (42.3%), followed by the others, from R$6,221 to R$12,440 (14.7%) and more than R$12,441 (2.6%).

The Confirmatory Factor Analysis serves to evaluate the reliability of the variables of a given model, also indicating possible eliminations in order to better adjust the final model (Santana et al., 2016). Next (Table 4), the standardized factorial loadings resulting from the application of the Maximum Likelihood method are presented. It should be noted that the loadings of all variables were higher than the reference value suggested by Marôco (2010) of 0.60, suggesting a good initial fit of the model.

Other relevant information refers to the adjustment indexes, which met the recommended level, according to the reference values indicated by Marôco (2010) and Hair et al. (2015). Table 5 presents the model's initial and final indicators, according to the data extracted by the Confirmatory Factor Analysis, as well as the values adopted as reference.

It should be noted that the adjustments were made only from the modification index, which indicate the need to include covariances between errors in order to generate better overall adjustment. (Gosling & Gonçalves, 2003, p. 94; Hair et al., 2005, p. 468). Thus, it can be observed that the parsimony indices (CFI, GFI, and NFI) indicate a good to very good fit of the final model.

Table 4
Standardized regression weights

			Estimate
P1	←	Greenwahing	,713
P2	←	Greenwahing	,755
P3	←	Greenwahing	,693
P4	←	Greenwahing	,693
P5	←	Greenwahing	,805
P6	←	Greenwahing	,718
P7	←	Greenwahing	,757
P8	←	Greenwahing	,737
P9	←	Greenwahing	,821
P10	←	Greenwahing	,792
P11	←	Greenwahing	,795
P12	←	Greenwahing	,751
P13	←	Greenwahing	,657

Source: Prepared by the authors based on the reference values suggested by Marôco (2010).

Similarly, the RMSEA index also showed a very good fit. A similar result was found in relation to the normed chi-square, considered good, almost very good. As for the SRMR parameter, the confirmatory stage indicator showed the mean square root of the standardized residuals assuming values ≤ 0.08. Considering that the SRMR can assume values ranging from 0 to 1. Thus, 0 (zero) would indicate a perfect fit of the model, assuming the premise that the lower the SRMR value, the better the fit (Boateng et al., 2018). Thus, the high level of adjustment of the final model after the improvement of the initial indexes stands out, which indicates its quality.

Table 5
Indicators and adjustments made through Confirmatory Factor Analysis

Index	Analyses		
	Initial	Final	Reference Value
Qui-Standard Square	1,58	1,07	>5 – poor fit]2;5] – poor fit]1;2] – good fit ~ - very good fit
CFI – Comparative Fit Index	,970	,997	[0,9; 0,95[– good fit ≥ 0,95 – very good fit
NFI – Normed Fit Index	,923	,953	
GFI – Goodness of Fit Index	,906	,942	
AGFI – Adjusted Goodness of Fit Index	,869	,911	
TLI – Tucker-Lewis Index	,964	,996	
RMSEA – Root Mean Squared Error of Approximation	0,61	,021	≤ 0,05 – very good fit
SRMR	0,074	0,057	0,08 ≤ – required fit

Source: Elaborated based on the survey results and on Marôco (2010) and Hair et al. (2015).

In this sense, the final model resulting from the Confirmatory Factor Analysis, adjusted from the parameters suggested by Marôco (2010) and Hair et al. (2015), is presented in the illustration below (Figure 1), followed by the presentation of the final validated scale (Table 6).

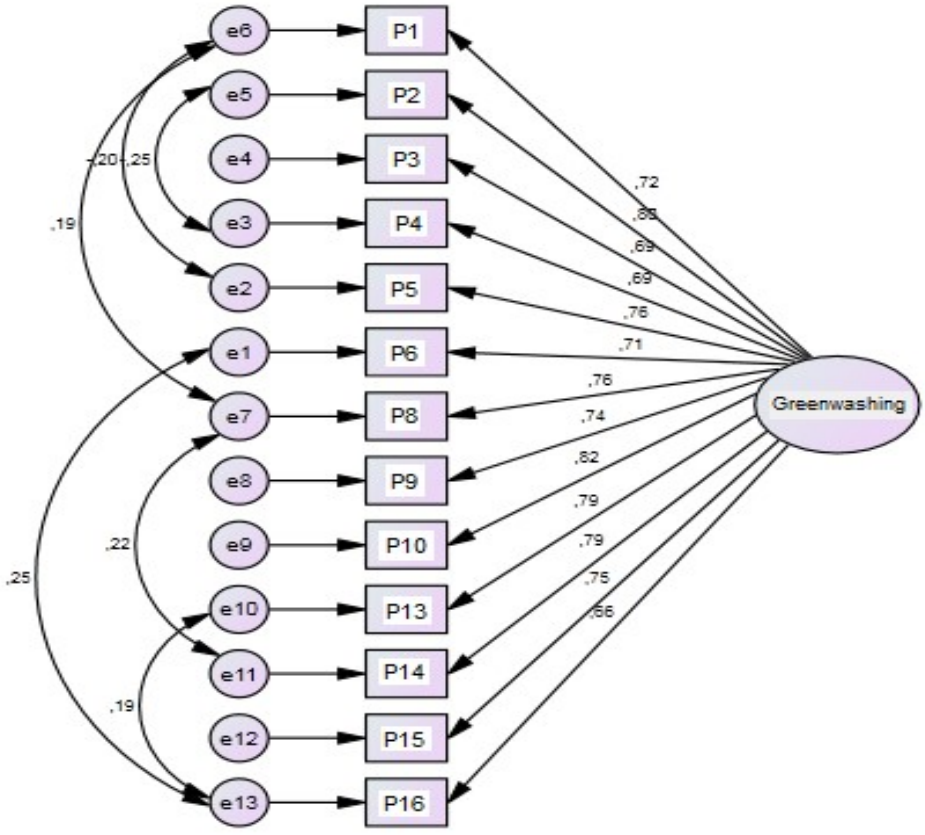

Figure 1. Final model - scale of consumers' judgment about the practice of greenwashing.
Source: Prepared by the authors based on the results obtained with the Confirmatory Factor Analysis (2020).

Table 6
Final Validated Scale - Consumers' judgment about the practice of greenwashing

P1	It is fairly easy for consumers to correctly interpret the environmental appeals used by organizations.
P2	The information conveyed by organizations about their green practice clearly demonstrate their environmental impact.
P3	The information conveyed by organizations about their green practice is always easily understood by consumers.
P4	The environmental appeals ensure that the products contribute positively to the preservation of the environment, regardless of the impacts generated in their process.
P5	The environmental benefits are completely assured when the product has a green seal.
P6	Organizations never intend to confuse consumers with irrelevant information.
P7	Organizations always make proof of environmental claims available to consumers.
P8	Consumers are always able to understand the truth about the information contained in environmental claims.
P9	The labels, seals and green figures adopted in the products are the guarantee that the organization is concerned about the environment.
P10	The arguments highlighted in the environmental appeals used by the organizations are true.
P11	Practically no organization conveys untruthful information about its environmental practices.
P12	There is no reason for consumers to doubt the environmental appeals made by organizations.
P13	Any and all green appeals used by organizations are truthful.

Source: Based on the survey results.

6. FINAL CONSIDERATIONS

The study aimed to develop and validate a scale to measure consumers' judgments about the practice of greenwashing. Thus, a final model was obtained composed of 13 assertions, whose result was between good and very good, according to the parameters suggested by experts in the area (Marôco, 2010; Hair et al., 2015).

In this sense, the study contributes to fostering the discussion about greenwashing, a practice that has been irresponsibly adopted by many organizations. The emergence and importance of the theme can be verified by the growing media coverage, which, as a consequence, has increased the concern of society, especially of consumers. However, such evidence ended up not finding theoretical support, since there are still few articles that work this theme, especially not in a deeper way, with real development and investigation of the phenomenon, in a comprehensive manner.

More importantly, the study advances the issue of measuring this phenomenon, even responding to suggestions for future research listed as priorities by previous pertinent literature (Lyon & Montgomery, 2015; Andreoli, Crespo & Minciotti, 2017; Ruiz Blanco et al., 2021). Moreover, it is pertinent when adopting as perspective the main interested public: the consumers. Thus, the discussion of this phenomenon has progressed only in the business world (by consultancies or interested organizations), or even in common sense. Thus, as far as we know, this is the first scientific attempt to create and validate an instrument that allows measuring the level of identification of greenwashing by consumers.

This advance is characterized not only as a theoretical contribution, but also brings important managerial implications. Among them, we can highlight, firstly, the need for organizations to be aware of marketing practices that encompass a supposed environmental concern without practical evidence (greenwashing). The green appeals disclosed by the organizations cannot simply contemplate the commercialization aspects, and there must be a consistency between speech and practice. Thus, as a main managerial contribution, it is suggested that the business community should reflect about the practices of environmental responsibility, adopting actions that are in fact green, and not just false.

This is especially important considering the consequences of this irresponsible practice in the consumer market, which is becoming increasingly skeptical of environmental practices as a whole. In this sense, another managerial implication is the importance of understanding the perception of consumers about the green practices currently adopted by organizations, understanding how they are evaluated and what possible measures can be taken to improve this communication.

The aforementioned contributions are confirmed by the already existing replication, application and adaptation of this scale. In the case of replication, Costa et al. (2020) obtained similar results in terms of scale validation, running both exploratory and confirmatory factor analyses. Similarly, Oliveira et al. (2020) corroborated the validation, but identifying two latent variables: dissensus and misinformation. In terms of application, Andreoli and Batista (2020) used the scale in an experiment with the real case of the brand Bombril, when investigating possible regulatory actions of the practice of greenwashing. Finally, there is an adaptation of the scale in the study by Andreoli and Nogueira (2021), to encompass both the greenwashing phenomenon and its social aspect, the bluewashing.

It should be emphasized that, despite the scientific rigor adopted in the development and validation of the model suggested by this study, some limitations should be noted, inherent to any scientific work. In particular, we highlight the reasonably small number of assertions developed, which, even covering the six dimensions suggested in common by previous publications, was

initially limited to sixteen. The profile of the samples used can also be questioned, since they were mostly composed of respondents with a high level of education.

In this sense, it is suggested that future studies investigate the possibility of creating and incorporating new assertions in order to test new possibilities of adjustments, aiming at a better improvement of the model. To this end, instead of the jury of experts, adopted in this study, the focus group technique could be used for the initial development of new assertions, for example, which would contribute to a better alignment with the consumers' perception.

Furthermore, it is recommended that this model be applied to a large audience of consumers. Thus, by adopting a large, random and probabilistic sample, future studies would be able to accurately investigate and measure the real perception of the selected population. With this done, besides enabling the emergence of new insights, investigating possible trends, it would also be possible to identify points of similarities and differences between distinct specific groups of consumers, such as young or older, female or male, low or high income, among others.

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CONFLICT OF INTEREST

The authors attest that there is no conflict of interest.

AUTHOR CONTRIBUTIONS

Additionally, we inform that the contributions of each author: the first author was responsible for the idealization, planning and execution of the article, working on the writing as a whole; the second author mainly headed the confirmatory factor analysis, with the realization of the structural equation modeling; the third author worked more as a supervisor, especially supervising the use of statistical techniques.