

# Corporate socioenvironmental report and greenwashing: analysis of a Brazilian mining company

ANA CAROLINA FERREIRA DE MELO BRITO <sup>1</sup>

SYLMARA LOPES FRANCELINO GONÇALVES DIAS <sup>1</sup>

ELISE SOERGER ZARO <sup>2</sup>

<sup>1</sup> UNIVERSIDADE DE SÃO PAULO (USP) / INSTITUTO DE ENERGIA E AMBIENTE, SÃO PAULO – SP, BRAZIL

<sup>2</sup> UNIVERSIDADE FEDERAL DA GRANDE DOURADOS (UFGD) / FACULDADE DE ADMINISTRAÇÃO, CIÊNCIAS CONTÁBEIS E ECONOMIA, DOURADOS – MS, BRAZIL

## Abstract

This case study analyzes the corporate socioenvironmental report (CSR) of a Brazilian company to identify potential vulnerabilities of the practice of greenwashing. Based on consultation of the relevant literature obtained from the databases of the CAPES Periodical Portal, SPELL, and Google Scholar, it was possible to identify the assumptions for the occurrence of greenwashing, arranged in categories for analysis. The study is qualitative and exploratory in nature, employing reflexive thematic analysis of the company's disclosures and the information obtained from newspapers in light of the pertinent legislation. The results partially confirmed the hypotheses in the sense that it is possible for greenwashing to occur related to the CSR. The results also indicated that the process of independent verification of the reports has a limited effect to counteract this potential practice. The singularity of this study is the interdisciplinary approach and analysis of publicly available information about a determined period compared to the content of the CSR. The triangulation of the information can contribute to a better understanding of the CSR and foster reflection on the role of corporate environmental communication and the need for better reporting of non-financial information.

**Keywords:** Environment. Socioenvironmental aspects. Environmental policies. Corporate sustainability report. Sustainability.

## *Relatório corporativo socioambiental e greenwashing: análise de uma empresa mineradora brasileira*

### Resumo

O presente estudo de caso propõe-se a analisar o relatório corporativo socioambiental (RCS) de uma empresa brasileira com o objetivo de identificar suas potenciais vulnerabilidades ao *greenwashing*. Com o mapeamento de literatura nas bases de dados do Portal de Periódicos CAPES, Spell e Google Scholar, foi possível identificar os pressupostos, que foram reunidos em categorias de análise, para ocorrência do *greenwashing*. Mediante abordagem qualitativa, de cunho exploratório, utilizou-se a análise temática reflexiva para confrontar as divulgações da empresa, as informações veiculadas em jornais e a legislação pertinente. Em conclusão, o caso analisado oferece evidências de que é possível que o *greenwashing* ocorra por meio do RCS. Também se concluiu que o processo de verificação independente dos relatórios tem uma atuação limitada na contenção dessa prática potencial. A singularidade deste estudo decorre da abordagem interdisciplinar e da disponibilidade de informações públicas sobre determinado período da empresa, analisadas em comparação com o conteúdo do RCS. Espera-se que a triangulação dessas perspectivas contribua para um melhor conhecimento sobre variedades de *greenwashing* presentes no RCS e fomente a reflexão sobre o papel da comunicação ambiental empresarial e o necessário aprimoramento das informações contábeis não financeiras.

**Palavras-chave:** Meio ambiente. Aspectos socioambientais. Políticas ambientais. Relatório corporativo socioambiental. Sustentabilidade.

## *Informe social y ambiental corporativo y greenwashing: análisis de una empresa minera brasileña*

### Resumen

El presente estudio de caso se propone analizar el informe corporativo socioambiental (RCS, por sus siglas en portugués) de una empresa brasileña para identificar sus potenciales vulnerabilidades al *greenwashing*. A partir del mapeo de literatura en las bases de datos de los portales de publicaciones científicas CAPES, SPELL y Google Scholar, fue posible identificar los presupuestos para la ocurrencia del *greenwashing*, reunidos en categorías de análisis. A través de un enfoque cualitativo, de carácter exploratorio, se utilizó el análisis temático reflexivo para confrontar las divulgaciones de la empresa, la información publicada en periódicos y la legislación pertinente. En conclusión, las proposiciones del estudio fueron parcialmente confirmadas, en el sentido de que es posible que el *greenwashing* ocurra a través del RCS. También se concluyó que el proceso de verificación independiente de los informes tiene un papel limitado para contener esta potencial práctica. La singularidad de este estudio deviene de su enfoque interdisciplinario y de la disponibilidad de información pública sobre determinado período de la empresa, analizada comparativamente con el contenido del RCS. Se espera que la triangulación de estas perspectivas de análisis contribuya a una mejor comprensión del RCS y fomente la reflexión sobre el papel de la comunicación ambiental empresarial y la necesaria mejora de la información contable no financiera.

**Palabras clave:** Medio ambiente. Aspectos socioambientales. Políticas ambientales. Informe corporativo socioambiental. Sostenibilidad.

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## INTRODUCTION

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This article studies the case of the Brazilian company Vale S.A. (Vale) and seeks to answer the following question: what elements in the company's corporate sustainability report could be interpreted as greenwashing? In 2016, the company, with more than 45,000 employees (Figo, Salomão, Melo, & Vaz, 2016), was excluded from the Brazilian stock exchange's corporate sustainability index (ISE) – a theoretical portfolio composed of companies who meet the standards regarding sustainability. However, in 2021 it was considered the second-largest publicly traded company in Brazil and the 113<sup>th</sup> in the world (Forbes, 2021).

The case is representative because this company's social and environmental practices affect the well-being of millions of people and have great potential for environmental impact. Vale's impact became clear in the collapse of the Fundão dam in November 2015. The dam was owned by Samarco – a joint venture between Vale and BHP Billiton (Vale, 2016) – and located in the municipality of Mariana (Brazilian state of Minas Gerais). The event was considered the biggest environmental disaster in Brazil (G1, 2019a; Marshall, 2018). In February 2019, a second tragedy occurred with the collapse of a tailings dam, Vale's Córrego do Feijão mine dam, in Brumadinho (also in the Brazilian state of Minas Gerais). The company was again in the spotlight, and this second collapse led Vale to disclose a lot of information about its environmental management. Against this backdrop, the company represents a unique case study, as it is possible to compare the information disclosed by the company and the information publicized by the press while following the developments of the environmental disasters. The empirical analysis of the elements of Vale's corporate sustainability reports that can be interpreted as greenwashing is an unprecedented endeavor among the 9,060 studies on the issue gathered by the Brazilian Ministry of Science, Technology, Innovations, and Communications (Ministério da Ciência, Tecnologia, Inovações e Comunicações [MCTIC], 2019). The choice of the case proved to be pertinent since, after the event in Mariana, the company presented inconsistencies in the accounting standards and inaccurate disclosure of its assets (Volpato & Tavares, 2016).

The corporate sustainability (CS) reports are strategic assessment instruments to present companies' corporate social responsibility (Ribeiro, 2012), and there are many issues regarding the accuracy of these reports. For instance, P. R. Silva (2013) states that firms do not primarily disclose environmental and social information for transparency but corporate marketing. Thus, disclosing such information has limited contribution to transparency and solving social and environmental problems. The research focused on CS reports in Brazil points out flaws to be addressed. The incipient environmental reports carried out in the country showed uneven disclosure and were hard to analyze (Calixto, Barbosa, & M. B. Lima, 2007). Thus, it is relevant to debug what is disclosed in the CS reports, as it is often an advertising piece (Lins & R. N. S. Silva, 2010; Torres & Mansur, 2008), with unconfirmed data and without independent certification.

This study focuses on greenwashing and the disclosure of CS reports, where the latter contains inaccurate environmental data inducing readers to believe the company is socially and environmentally responsible. In this article, greenwashing refers to disseminating false, doubtful, or opportunistic socio-environmental information, leading third parties to reach incorrect conclusions about the company's nature, attributes, benefits, or activities (Antoniolli & Gonçalves-Dias, 2015; Pagotto & Carvalho, 2020). Greenwashing can also manifest through selective disclosure of information about a company's environmental performance (Marquis, Toffel, & Zhou, 2016), with concealment of negative information (Lyon & Maxwell, 2011). This study is particularly important since it brings empirical evidence about the practice of greenwashing in corporate disclosure.

Research by K. R. Batista, Melo, and Carvalho (2016) adopted content analysis of environmental disclosures of four companies in the mining sector. The authors observed that some environmental items are not sufficiently disclosed to allow deeper analysis. After the disasters of unprecedented proportions associated with Vale in Brazil, an improvement in the company's CS reports was expected, as the issue attracted the attention of society and researchers. Therefore the topic is timely, relevant, and pertinent considering the socio-environmental impact experienced after the disasters and the growing trend of CS report disclosure by companies, raising questions about legitimacy and effectiveness (Misoczky & Böhm, 2012).

## LITERATURE REVIEW

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Accounting disclosure of environmental liabilities is a platform for disclosing environmental issues and reducing information asymmetry. Corporate sustainability (CS) reports are a frequent topic in the literature, and there is no single explanation for the increasing number of published reports (C. R. M. Silva, D. S. V. R. Lima, Santos, Cabral, & Pessoa, 2017). This increase in CS reports may suggest that companies have reacted to new regulatory mechanisms (Cunha & Ribeiro, 2016) or that there is a directly proportional relationship between the degree of internationalization and the level of environmental disclosure (A. B. Batista, Bruni, & Cruz, 2016; Kolk, 2004). Companies that publish their CS reports benefit because they indicate responsible behavior, favoring the process of legitimacy to customers and investors, increasing loyalty and external investments. This legitimacy can come from compliance with standards by managing impressions regarding compliance with the regulation (Di Tullio, Valentinetti, Nielsen, & Rea, 2019; Jatahi, 2004). Albuquerque, Rodrigues, Miranda, and Sampaio (2017) confirm that the disclosure of CS reports has the potential to generate financial gains, and companies may be motivated to disclose by rationally maximizing their gains. Other factors that lead to voluntary disclosure of information (Lopes & Demajorovic, 2020; Miller, Su, Perez-Batres, & Pisani, 2020) may be related to (i) its potential to cause environmental impacts (Cardoso, Luca, & Almeida, 2016); (ii) strong regulation, as occurs with companies in the energy sector (J. S. Ferreira, Rover, D. D. M. Ferreira, & Borba, 2016); or (iii) degree of exposure and need for company legitimacy (Bertrand, Betschinger, & Moschieri, 2021).

The literature recognizes the economic benefits of publishing CS reports arguing that this can demonstrate the organization's contribution to society. However, there is a long way to go before this instrument more explicitly helps companies garner social legitimacy from stakeholders (Ditlevsen, Nielsen, & Thomsen, 2013). Given the necessary interactions in a globalized or hyperconnected world, disclosing sustainability actions is crucial for companies, which need stakeholders to believe that they adopt sustainable actions (Antoniolli & Gonçalves-Dias, 2015; Araújo, Gonçalves-Dias & Pagotto, 2019; Jenkins & Yakovleva, 2006).

Studies examining the need for standards and third-party verification to guide companies on environmental indicators and the issues they should communicate have increased over the past decades (Jones, 2019; Kolk, 2004; Reid & Toffel, 2009; Ribeiro, 2012). However, the concept of "sustainability" is polysemic, i.e., has different interpretations (M. Bursztyn & M. A. Bursztyn, 2012), and is appropriated by different interest groups, who understand it in different ways and project different expectations around its consequences (Gonçalves-Dias & Teodósio, 2011). The absence of trustworthy criteria seems to favor the companies' discourse and hinder the construction of spaces for the consumer-citizen (Gonçalves-Dias & Teodósio, 2012; Portilho, 2005). Along these lines, proposals have emerged to monitor and verify corporate sustainability. However, Antoniolli and Gonçalves-Dias (2015) highlighted that governmental regulation in this area is an issue with many conceptual and methodological gaps to be filled.

In Brazil, corporate sustainability reports are observed in few companies, predominantly among large companies that are subject to the international market or regulatory controls. However, such disclosure does not necessarily correspond to actual sustainability practices (Jenkins & Yakovleva, 2006). Iudícibus, Martins, and Carvalho (2005) noted that CS reports tend to seek institutional promotion instead of social responsibility reporting. Studies evaluating CS reports by confronting the businesses discourses and their practices have identified information inaccuracy (Garcia, Cintra, Ribeiro, & Dibbern, 2015) and deficiencies regarding content (Oliveira, 2005) and comparability between companies, which suggests opportunities and challenges (Brucksch & Grünschloß, 2009). Zaro (2015) pointed out that the content of Brazilian CS reports does not demonstrate in-depth analysis, and they need to evolve and be more accurate to be used as an accountability tool to attract investors (Ribeiro, 2012).

Souza, Tarifa, and Panhoca (2019), in an analysis of the changes in environmental disclosure in the Brazilian mining sector after the collapse of the Fundão dam in the municipality of Mariana, pointed out the companies' use of impression management strategies (Jatahi, 2004) to publicize environmental impacts. Lopes and Demajorovic (2020) analyzed Samarco's (a joint venture between Vale and BHP Billiton) sustainability reports from 2005 to 2014 and concluded that there were weaknesses between the corporate social responsibility discourse and practice. Although Samarco has pointed out a growing concern with the issues of safety, dams, and waste, these issues were not reflected in the community's perspective and dialogue (Lopes & Demajorovic, 2020), nor in Vale's report, until the tragedy occurred (Souza et al., 2019). Marshall (2018) compared the disasters in Mariana (Brazil) and Mount Polley (Canada) and found similarities in the organizations' discourse, as they treated the episodes as isolated incidents and tried to attenuate the perception about the tailings' toxicity levels and water system contamination.

These tactics consisted of hiding information and attributing it to external factors, presenting a selective discourse about their environmental impacts, in line with conceptions about greenwashing expressed in the literature (Delmas & Burbano, 2011; Lyon & Maxwell, 2011; Marquis et al., 2016).

In this sense, studies to analyze the elements in CS reports that could be interpreted as greenwashing gain relevance. Delmas and Burbano (2011) pointed out possible triggers for the practice of greenwashing, and other studies followed them in an attempt to empirically demonstrate its occurrence (Miller et al., 2020). Regarding the measurement of greenwashing (Bowen, 2014; Reid & Toffel, 2009), no concept is unequivocally adopted in the literature, mainly because research on greenwashing expresses views of different disciplines about the phenomenon (Gatti, Seele, & Rademacher, 2019). In this study, the categories of analysis were used according to the form of greenwashing shown in Box 1.

**Box 1**  
**Forms of greenwashing identified in the literature**

Category	Description	Examples	Authors
Misleading narrative or discourse	Manipulation of the environmental discourse using exaggeration, unrealistic pretensions, and irrelevant and generic statements.	The company treats legal obligations as voluntary investments in the environment.	Jones (2019); Lyon and Montgomery (2015); Marciniak (2009); Pagotto and Carvalho (2020)
	‘Green’ rhetoric suggesting that the company has a “more enlightened” approach.		
Meaningless green policies and claims	Making promises/commitments, they do not keep.	The companies make environmental promises to impress consumers and investors and do not follow through on the action.	Jones (2019); Lyon and Montgomery (2015)
Selective disclosure	Selectively disclosing positive attributes, keeping negative data from the public.	The company avoids disclosing negative information that is not actively monitored by its boards and investors.	Jones (2019); Lyon and Montgomery (2015); Marquis et al. (2016)
	Omitting negative environmental impacts from the business operation, highlighting only positive impacts.	Divert attention to parallel socio-environmental projects.	Lyon and Maxwell (2007); Pagotto and Carvalho (2020)
	Emphasize specific attributes, leaving aside the product/company as a whole.	British Petroleum’s “beyond oil” campaign, emphasizing the company’s investments in solar energy.	
Lying	Lying, using false data, making statements that distort reality or cannot be proven.	Use meaningless environmental messages, such as “nature-friendly company,” or presenting self-awarded environmental seals or certificates without proof or credibility.	Jones (2019); Pagotto and Carvalho (2020)
Unproven statements		Araújo et al. (2019); Gillespie (2008); Marciniak (2009)	

Source: Elaborated by the authors.

Therefore, the guidelines obtained from the literature help to observe potential greenwashing in CS reports. In this article, we examined the CS reports published by Vale from 2015 to 2021, observing elements that could be interpreted as greenwashing.

## METHOD

The study consists of a case study examining the Brazilian mining company Vale S.A. and the research question is: what elements in Vale’s corporate sustainability reports could be interpreted as greenwashing? We adopted thematic analysis (Braun & Clarke, 2012) to compare the company’s annual corporate sustainability (CS) reports, information about the company published in newspapers, and the relevant legislation impacting its business to assess potential greenwashing in the reports.

As the research encompasses a period where the company was involved in unprecedented tragedies in Brazil (the collapses of dams in Mariana and Brumadinho), the exploratory qualitative approach proved adequate. From an interdisciplinary perspective (Gatti et al., 2019), the data corpus was treated by searching patterns and codification, forming themes as the object of reflective and deductive analysis based on the chosen concepts (Clarke, Braun, Terry, & Hayfield, 2019). The thematic analysis helped identify and carry out the codification, enabling a broad understanding through thematic patterns selected in Vale’s CS reports published between 2015 and 2021. Such patterns allowed the identification of the relationships between the topics and the research question (Braun & Clarke, 2012). Box 2 presents the steps followed to build the conceptual-theoretical framework and subsequent data analysis.

**Box 2**  
**Methodological path**

Steps	Object
Case selection	Vale’s corporate sustainability reports.
Literature review, building the conceptual-theoretical framework	Definitions and examples of greenwashing.
	Criteria to assess greenwashing.
	Accounting norms and best practices of CS reports.
	Evaluation of CS reports and greenwashing in the literature.
Documentary research	Vale’s corporate sustainability reports published from 2015 to 2021.
	Public statements from the company and stakeholders.
	Environmental laws.
	Information on court lawsuits related to the events explored in the case study.
Content analysis	Provisory definition of themes.
Codification	Based on information obtained from documentary research.
Defining themes	Review and confirmation of outcomes from the previous steps.
Written	Reflexive analysis of the selected themes.

Source: Elaborated by the authors.

Greenwashing can be measured through a single information unit, such as an advertisement (Antoniolli & Gonçalves-Dias, 2015; Pagotto & Carvalho, 2020) or a website (Kassinis & Panayiotou, 2018). Thus, Vale’s 2015 CS report (Vale, 2016), produced after the first dam collapse in Mariana, was the starting point for identifying the themes of this analysis. The singularity of the moment analyzed, the choice of the CS report presented (between the two tragedies Mariana in 2015 and Brumadinho in 2019), and the contradictions when comparing the CS report and the company’s public statements justify the approach and the selection of codes and themes. The themes of analysis in the reports from 2015 to 2021 were compared to confirm the research findings and obtain a broader time scale.

The construction of the conceptual framework to identify potential greenwashing in CS reports was based on a literature review. Keywords related to the topic – *relatório corporativo socioambiental* (corporate sustainability report); *comunicação ambiental* (environmental disclosure) and greenwashing – were searched in the database of the University of São Paulo (USP) and other sources such as Google Scholar, CAPES portal of journals, and Spell. We also searched the same keywords in the literature (until 2019) about disasters (MCTIC, 2019), analyzed the theme’s adherence, and incorporated new sources. After identifying the sources, content analysis was carried out (Quivy & Van Campenhoudt, 1992), and the abstracts were read to identify the most relevant documents for this research, followed by in-depth reading of the secondary sources. At the end of this step, it was possible to identify the assumptions for the occurrence of greenwashing. Finally, adopting the conceptual basis described in Box 1, we sought to identify elements that could be interpreted as greenwashing in Vale’s CS reports published from 2015 to 2021.

The documentary research included the object of study (Vale’s CS reports published between 2015 to 2021), public statements, and documents from the company and stakeholders, including lawsuits related to the case. Vale’s CS reports were downloaded from the company’s website. As for environmental legislation, the research considered the Brazilian 1988 Federal Constitution (Constituição da República Federativa do Brasil de 1988 [CF], 1988); Decree 6,514 of July 22, 2008 (Decreto nº 6.514, de 22 de julho de 2008), which defines environmental administrative infractions; and Law 9,605 of February 12, 1998 (Lei nº 9.605, de 12 de fevereiro de 1998), which establishes environmental crimes, as the basis for the main environmental obligations observed in this case. This information enabled us to distinguish which environmental actions listed as investments by the company in its CS reports consist of mere compliance with legal obligations. Vale’s newspaper articles and public statements were selected from the most accessed news sites by Brazilians in 2015 (Canaltech, 2015): Google, Globo, Yahoo; and searches were carried out for the ten most relevant news published in these portals, with the following words: “fundão,” “Mariana,” and “Vale”. On Google, the search period was established between January 2015 and December 2016. In other portals, it was not possible to limit this time interval.

A detailed reading of Vale’s CS reports (Vale, 2015, 2016, 2017, 2018, 2019, 2020, 2021) was carried out, identifying elements that could be interpreted as greenwashing through content analysis (Quivy & Van Campenhout, 1992), combined with the thematic analysis (Braun & Clarke, 2012). Based on this reading, there was a thematic classification and data triangulation with the collected documents and literature review to verify whether Vale’s CS presented elements suggesting greenwashing through the analysis categories listed in Box 3.

**Box 3**  
**Codes and themes of analysis used in this research**

Themes	Codes
Greenwashing	Definitions, forms, and examples of greenwashing.
	Criteria to evaluate greenwashing.
Corporate sustainability reporting	Evaluation and best practices regarding corporate sustainability reports in the literature.
Company’s public statements	Vale’s corporate sustainability reports published from 2015 to 2021.
	Company’s statements about dam safety, pollution due to the tailings dam collapse, complying with legal obligations, indemnities, socio-environmental investments.
Stakeholders’ public statements	Statements from the Federal Public Prosecutor’s Office (MPF), state government, investors, institutions about dam safety, pollution due to the tailings dam collapse, complying with legal obligations, indemnities, socio-environmental investments.
	Information on court lawsuits related to the events explored in the case study.
Company’s legal obligations	Environmental law.
Accounting standards	Accounting norms.

Source: Elaborated by the authors.

## DATA ANALYSIS AND DISCUSSION OF RESULTS

The corporate sustainability (CS) report that defined the categories of this analysis (Vale, 2016) was presented after the collapse of the dam in Mariana-MG (G1, 2019a). After 2017, there was an emphasis on the activities of the Renova Foundation, maintained by Vale, Samarco, and BHP Billiton, to carry out programs to address the disaster in Mariana-MG. The report disclosed the amounts spent on environmental recovery, indemnities, and improvement of the company’s management.

Vale’s CS report for 2015 (Vale, 2016) refers to an “accident” when dealing with the collapse of the Fundão dam. Lopes (2017) observed the systematic use of the terms “natural disaster” and “humanitarian response” in Samarco’s discourse. For the author, the terms do not apply in this case because it was a technological disaster caused by the company’s poor risk assessment.

In the report's section with the message from Vale's Board of Directors (Vale, 2016), the company's leaders offered solidarity to those affected, with a commitment to sustainable development. They declared the company had invested around USD 800 million in the socio-environmental measures (information mentioned in other parts of the report). However, when detailing social expenditures, it is clear that 70% attended mandatory actions, and 30% referred to voluntary social investment. As for environmental expenditures, there is no percentage indication of voluntary and mandatory expenditures. It is noted that around USD 83 million was allocated to recover degraded and contaminated areas, a mandatory action for mining companies according to § 2 of article 225 of the 1988 Brazilian Federal Constitution (CF, 1988), which provides that whoever explores mineral resources must recover degraded environment.

The CS report (Vale, 2016) did not comply with the disclosure requirements described in item 15.2.4 – interaction with the environment, of NBC T 15, issued by the Federal Accounting Council (Conselho Federal de Contabilidade [CFC], 2004), which determines the differentiation between investments and expenses with maintenance or restoration of degraded environments, or with other environmental projects.

The company's value added statement (VAS) does not mention the investment of USD 800 million declared in the message from the company's board (Vale, 2016) but shows investments of USD 228 million in the community, of which USD 193 million was spent in Brazil. It is observed that the Brazilian accounting standards (CFC, 2004) distinguish expenditure and investment, maintenance of operational processes and activities of environmental protection, and distinguishes fines, indemnities, and environmental liabilities. In the CS report analyzed, these distinctions are not clearly stated, and presenting legal obligations as investments in environmental protection is a form of greenwashing (Lyon & Montgomery, 2015; Marciniak, 2009; Pagotto & Carvalho, 2020). Although the company's socio-environmental expenditures in 2015 are not detailed, other information from Vale's CS 2015 report (2016) allows us to infer that part of the amounts reputed as investments actually refers to expenditures arising from legal obligations. The full repair of environmental damages is an obligation provided for in article 225, §3 of the 1988 Brazilian Federal Constitution (CF, 1988).

We could not assess whether the USD 800 million in socio-environmental investments includes expenses with repairs and indemnities already assumed by the company in 2015 due to the Mariana disaster. The section entitled "Accident in Mariana" states that a broad agreement was signed between the Attorney General's Office (AGU) and Samarco and its controllers Vale and BHP Billiton. Only the expenses incurred by Samarco after the dam collapse are mentioned, and then there is an indication of various investments that were or will be carried out as a result of the event, but they cannot be distinguished from investments in the socio-environmental area of that year. Some "social and environmental projects" are mentioned. However, the values of investments in future projects are among the "declarations of intent," which are items not audited by the independent certification agency contracted by Vale.

Marquis et al. (2016) consider selective disclosure of information as greenwashing. In the case studied, Vale's CS 2015 report (Vale, 2016) was not explicit that the amounts presented should not be confused with investments since they are the legal obligations for compensation, mitigation, and repair of damages caused by the collapse of the Fundão dam. Thus, although one cannot bluntly say that there was greenwashing, it can be inferred that the report was imprecise or vague regarding expenses with legal obligations and, therefore, could be interpreted as greenwashing. For example, expenses with obtaining environmental licenses, environmental compensation for non-mitigable impacts, studies required for inspection, and damage repair can be confused with investments when the distinction between voluntary investments in the socio-environmental area and legal obligations is not explicit.

A section of Vale's CS 2015 report (2016, p. 82, our translation) mentions the company's conduct as exemplary and agile, since "In all situations, the company has contributed proactively with inspection agents promptly presenting the requested documents [...]". If considering that the concept of "proactive" (or "*proativo*" in Portuguese, as originally used in the report) refers to anticipating future changes or problems (Michaelis, 2021), the company's report brings an exaggeration or an irrelevant statement (Lyon & Montgomery, 2015) when mentioning that Vale acted proactively by delivering documents and information requested by the inspection after the Fundão dam collapsed in Mariana. In this case, handing over documents is a legal obligation, provided for in articles 68 and 69 of Law 9,605 of February 12, 1998 (Lei nº 9.605, de 12 de fevereiro de 1998). Failing to collaborate with inspection or non-compliance with relevant environmental obligation, may result in imprisonment from one to three years and a fine. Failing to submit the information requested by the inspection or preventing inspection constitutes an environmental administrative infraction, punishable by a fine, under article 81 of Decree 6,514 of July 22, 2008 (Decreto nº 6.514, de 22 de julho de 2008).

Considering the legal provisions described above, the statement that the company acted proactively after the dam collapse in Mariana for having presented documents and information requested by the authorities may be considered irrelevant or exaggerated. Therefore, such declaration in the CS report may be interpreted as greenwashing (Jones, 2019; Lyon & Montgomery, 2015; Pagotto & Carvalho, 2020).

Emphasizing what was called “proactive behavior” after a disaster can be a means of diverting attention in the report or manipulating the discourse, which are forms of greenwashing, according to Pagotto and Carvalho (2020). This statement in the CS report can be questioned, given that the Federal Public Prosecutor’s Office in the State of Minas Gerais (MPF-MG) accused the company of criminal conduct by ignoring its responsibilities and assuming the risk of originating the event. Thus, Vale is accused of not having acted “proactively” to prevent the tragedy when they were conscious of the increase in its operational risks (Ministério Público Federal do Estado de Minas Gerais [MPF-MG], 2021).

The MPF-MG also accused Vale of not providing sufficient information to the authorities and hampering the inspection action, failing to comply with legal obligations of relevant environmental interest by depositing tailings in the Fundão dam, without informing the competent bodies (MPF-MG, 2021).

Importantly, the accusations are partial and represent an opposite opinion of the company that will need to be proven in the criminal proceeding filed with the complaint. However, the elements contained therein may cast doubt on the posture and the environmental discourse published by Vale (2016, 2017, 2018, 2019, 2020, 2021).

The criminal complaint was received by the Federal Court, giving rise to case 0002725-15.2016.4.01.3822, still in progress at the 1<sup>st</sup> Court of the Federal Subsection, in Ponte Nova-MG, for investigation of the crime of flooding – an accusation of homicide was also presented, but it was later excluded from the legal process (MPF-MG, 2021). In November 2020, the public prosecutor and the Public Defender’s Office recommended that the Renova Foundation stop broadcasting incorrect content and spending massive amounts of money (BRL 17.4 million with advertising agencies, for example), securing resources to compensate for the damages caused. The prosecutors suggested avoiding disseminating “inaccurate, dubious, incomplete, and misleading” information and content aimed at the self-promotion of the foundation’s sponsors (MPF-MG, 2020). In 2021, these allegations gave rise to a lawsuit against the company.

Another element regarding greenwashing concerns statements made by Vale (2016) about the dams’ safety. In 2016, Vale (2016, p. 81) stated that in order to “bring greater comfort to society,” it carried out an extraordinary and detailed verification of the structural conditions of all its dams; however, safety inspections did not point to any risk of new breakages or alterations to any of the structures. Lopes and Demajorovic (2020) found no evidence of transparent communication regarding the risks inherent to the activity of Samarco until 2014, a year before the tragedy in Mariana. Also, the existence of relevant risks was denied in Vale’s CSR report (2016). Until the second collapse in Brumadinho, knowledge of the possible risks of other dams had not been disseminated. However, Marshall (2018) reports that Vale and BHP Billiton representatives participated in multiple discussions between 2009 and 2014 about dam construction problems. In addition, the news that followed the second disaster, in 2019, pointed to the reclassification of dam risks and the urgency of the company to decommission or repair higher risk points, which even caused, preventively, the displacement of people who lived around some of these dams (Jucá, 2019). After the tragedy in Brumadinho-MG, exceptional investments by Vale (BRL 7.4 billion) were also reported to accelerate the closure of nine dams in the State of Minas Gerais (Reuters, 2019). In 2020, Vale (2021) approved new dam safety and tailings management policies, including the implementation of the Vale Tailings and Dams Management System, with a series of measures aimed at providing more transparency, routine, performance, and monitoring of risks of the 157 dams maintained in Brazil, with a cost of USD 2.3 billion by 2025.

Several authors (Gillepsie, 2008; Marciniak, 2009; Pagotto & Carvalho, 2020) refer to greenwashing as lying, using false data, making statements that distort reality or cannot be proven. Based on the data exposed above, it cannot be concluded that there was a distortion of data and information by Vale (2016). However, the company’s information regarding the environmental impact of the Fundão dam collapse was contested by renowned institutions, supporting claims that data reported in the company’s CS 2015 report (Vale, 2016) were inaccurate.

Vale (2016) denied the impacts in the Abrolhos-BA region, stated that the tailings did not present any chemical element harmful to health, having been characterized as non-hazardous, and highlighted the continued existence of fish along the Rio Doce river, which would have affected an area of less than 1%. However, these statements regarding the toxicity of tailings (G1, 2015) and the environmental impact of pollution (G1, 2019a; Jornal da USP, 2018) have been publicly contested by international organizations and scientific researchers. As for the accident in Brumadinho-MG, Vale (2019) stated that the tailings were not dangerous. However, the disclosure about the risks of the operation and the danger of the tailings was considered apparently misleading by foreign shareholders, who filed lawsuits against the company after the disaster in Brumadinho-MG. According to Brazilian press reports, the company failed to “assess the risk and potential for damage from a dam collapse.” Therefore, Vale’s statements were assessed as “false or misleading and/or lacking reasonable support” (O Globo, 2019, our translation).

In 2014, Vale (2015) classified the topic “waste” as non-material, i.e., irrelevant. In the following year (Vale, 2016), the process was reviewed, and the topic was included in the CS report. Even if the company used a biased discourse (Souza et al., 2019), it would no longer be possible to hide the relevance of this theme regarding the company’s operations and environmental impact. Lopes and Demajorovic (2020) indicate that, after the tragedy, a panel of independent experts hired by Vale and BHP Billiton highlighted incidents involving the Mariana dam since 2009. Coissi and Braga (2015) specify that 28% of the releases in the Fundão dam in 2014 corresponded to Vale’s tailings, without the corresponding environmental license for this activity.

After exposing with concrete examples the elements in Vale’s CS report that could be interpreted as greenwashing, it is worth mentioning that none of the data presented in this study led to definitive conclusions that allow saying that the company practiced greenwashing through its CS reports. The facts are controversial, and there is no definitive decision in court to assess responsibilities and extent. The disaster in Brumadinho is still recent, and the company was sentenced to repair the damage caused to people, the environment, and economic activity in the affected region (Coissi & Braga, 2015; G1, 2019b). This first sentence does not yet reflect a final ruling by the Judiciary. As for the Mariana disaster, there have been no legal convictions so far, which may occur regardless of the company’s extrajudicial agreements. Samarco and its controllers Vale and BHP Billiton entered into a USD 5.8 billion agreement with the Brazilian federal government, the states of Espírito Santo and Minas Gerais, and other Brazilian government authorities to implement programs to repair and compensate for the Fundão dam collapse.

Bureau Veritas Certification Brazil (Vale, 2015, 2016, 2017, 2021) and SGS ICS Certifier (Vale, 2018, 2019, 2020) independently verified the company’s CS reports. The scope of this verification covered the Global Reporting Initiative (GRI) Guidelines and Principles for Sustainability Reporting, including the 2013 GRI Mining & Metals Sector Supplement (Vale, 2016). In 2021, the integrated report was adopted, also with independent verification. Any assessment of information related to position statements (expressions of opinion, beliefs, objectives, or future intentions) by Vale was excluded from the analysis of the independent verification agents. In this process, the criteria for greenwashing in the literature and discussed in this article were not the subject of the independent organizations’ analysis.

## FINAL CONSIDERATIONS

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This article studies a case of accounting and environmental disclosure, observing the complex issue of greenwashing. The research described the phenomenon and explored the points of view presented in Vale’s corporate sustainability (CS) reports published from 2015 to 2021, showing elements that could be interpreted as greenwashing. The uniqueness of this study resulted from the interdisciplinary approach when comparing public information made available for a period analyzed to the content of the company’s CS reports.

As for the thematic analysis, it was observed that there was an improvement in the information provided in Vale’s CS reports (2021) concerning the items: dam safety and indemnities related to the disasters in the Brazilian municipalities of Mariana and Brumadinho (both in the state of Minas Gerais). However, information on the effects of pollution resulting from these events remains unclear, and progress is still needed to distinguish socio-environmental investments from compliance with legal obligations, as determined by the applicable accounting standard (CFC, 2004).

The triangulation of different perspectives carried out in this study is expected to contribute to a better understanding of the forms of greenwashing that may be present in CS reports and encourage reflection on the role of corporate environmental disclosure and the necessary improvement of non-financial accounting information. In this sense, there is a clear demand for increased transparency about environmental performance to increase knowledge about greenwashing.

Thus, the effective implementation of stricter regulation is challenging due to the lack of clarity about what constitutes green behavior and the confusion surrounding the disclosure of corporate actions toward sustainability. The analyzed case showed that the independent verification process of the CSR reports is limited in identifying potential greenwashing. Thus, regardless of the conclusion about greenwashing in the case of Vale S.A., it is clear that there are elements that can be interpreted as greenwashing in the company's CS reports, which may occur regardless of the certification of independent agents, who cannot prevent such a practice. Thus, the results suggest the need for joint work between companies and government around a regulatory framework to make information available adequately for society and decision-making in companies. Through a multi-stakeholder approach, transparency and the improvement of corporate environmental performance must be privileged. From this perspective, there is a clear need for incentives, through public policies, for companies to disclose quality environmental information.

Finally, future research on this issue may explore the hypothesis that greenwashing in CS reports may not be useful or very effective for these reports' target audience. Also, research is needed to analyze other companies empirically or conduct case studies, systematic analysis, comparison with earnings management metrics, and seek other methods to verify greenwashing practices. Such studies are crucial to improving the debate about corporate sustainability reports.

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Ana Carolina Ferreira de Melo Brito  
ORCID: <https://orcid.org/0000-0003-3265-1951>

Ph.D. student of the Graduate Program in Environmental Science at the Institute of Energy and Environment (PROCAM-IEE) at the University of São Paulo (USP). E-mail: [anacarolinabrito@usp.br](mailto:anacarolinabrito@usp.br)

Sylmara Lopes Francelino Gonçalves Dias  
ORCID: <https://orcid.org/0000-0001-6326-2129>

Associate Professor of the Graduate Program in Environmental Science at the Institute of Energy and Environment (PROCAM-IEE) and of the Graduate Program in Sustainability of the School of Art, Sciences, and Humanities (EACH) at the University of São Paulo (USP). E-mail: [sgdias@usp.br](mailto:sgdias@usp.br)

Elise Soerger Zaro  
ORCID: <https://orcid.org/0000-0002-3235-719X>

Adjunct Professor of the Undergraduate Program in Accounting at the Federal University of Grande Dourados (UFGD). E-mail: [elisezaro@ufgd.edu.br](mailto:elisezaro@ufgd.edu.br)