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# Gender Diversity of Board Members and the Quality of Information in Sustainability Reports in Brazil

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## Abstract

Objective: The objective of the study is to analyze the relationship between gender diversity on the Board of Directors of companies included in the Brasil, Bolsa, Balcão Corporate Sustainability Index (ISE) and the quality of information in sustainability reports, from 2014 to 2021.
Method: The sample comprised 33 companies, providing 244 observations. The variables used to analyze the quality of information in sustainability reports were balance, conciseness and clarity, reliability, and comparability.
Results: The results of the research demonstrated that there is no significant relationship between the composition of the board of directors in terms of gender and the informational quality of sustainability reports. The readability of the reports showed a significant and negative relationship for companies belonging to the ISE, demonstrating that they publish more complex reports than companies that are not part of the index. Furthermore, the results showed that companies with a female Chief Executive Officer (CEO) tend to have a board of directors with a greater female presence, which, in turn, is also more common in companies that belong to the ISE.
Contributions: The results of the study contribute to fostering debate on the impact of women's presence in the market and the quality of information reported. Although the results of the research differ from the studies used on a theoretical basis, they are consistent with market expectations, where specific gender issues should not be factors that make a difference in the quality of information reporting.

Keywords: Gender Diversity. Information Quality. Sustainability Reports.

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# Introduction

The stock market, as an effective tool for raising capital for companies, requires reliable and timely information from accounting, capable of supporting the decision-making process (Healy & Wahlen, 1999; Watts & Zimmerman, 1978). Such information becomes useful and capable of influencing future expectations when it meets the qualitative characteristics of accounting information, thus contributing to its improvement (Hendriksen & Van Breda, 1999). Therefore, it can be inferred that accounting information has its quality improved as it adequately uses its discretionary and subjective space, impacting the organization's added value, reputation, credibility, security, and verifiability (Dechow et al., 2010; Marinagi et al., 2015).

One way to use discretionary space is through voluntary disclosure, which demonstrates a communicative pattern between the company and the market, becoming an element of business strategy capable of filling gaps in pursuit of improving information quality (Gibbins et al., 1990). Although there is evidence that managers are not inclined to disclose information beyond legal obligations (Verrecchia, 2001; Wang et al., 2021), voluntary disclosure is a determining factor in the credibility and quality of information contained in reports, as it tends to anticipate market reactions (Dye, 2001), being linked to the effective allocation of resources in the capital market (Barros et al., 2018).

Voluntary disclosures are used as accountability to society, by companies with greater information transparency and economic, social, environmental, and ethical commitments (Prado et al., 2008). However, discretionary space can be used as an information management tool, whether in recognition and measurement aspects – as in earnings management – or in disclosure aspects – as in impression management (Lim et al., 2018; Merkl-Davies & Brennan, 2007).

An example of voluntary disclosure in Brazil is the sustainability report, which has been the subject of studies analyzing the lack of standardization with the use of information management (Adams & Abhayawansa, 2022; Lin et al., 2020; Martinez, 2008). In this scenario, the Global Reporting Initiative (GRI) was created with the purpose of defining globally accepted standards, making sustainable information auditable, reliable, and comparable through its pillars (Garcia & Orsato, 2013). The basis used for its development was Environmental, Social and Governance (ESG), which defined criteria used in different investment portfolios (Matos, 2020). In Brazil, the ESG acronym was inserted into the stock market together with the Corporate Sustainability Index (ISE) of Brasil, Bolsa, Balcão (B3), developed with the purpose of demonstrating Brazilian companies' commitment to sustainable criteria using GRI standards and integrating the economic, environmental, social, and transparency spheres (Cecon et al., 2018).

By using sustainable criteria as a performance measure (Forcadell & Aracil, 2017), the word "stakeholders" in its corporate concept came to be translated as those who have certain power to affect or be affected by the objectives and decisions of a given organization (Freeman, 1984). Thus, stakeholder theory developed under the pillar of generating trust in a solid manner for external users (Schaltegger, 2012). In this panorama, the theory is based on the voluntary disclosure of sustainable information, attributing to boards of directors the role of developing, controlling, and disclosing social information, as well as being accountable to interested groups (Hill & Jones, 1992). Due to the information asymmetry existing in markets, this assumption of stakeholder theory contributes to improving the disclosed information, as it transmits and signals the impact of such information (Richardson, 2000; Wood & Jones, 1995).

Just as the environment and social issues external to the organization impact business operations, the presence of more women in senior management positions affects the overall performance of organizations (Cardoso, 2021). Empirical studies show improvement in the quality of information reported to senior management in companies with diversified executive composition in terms of gender, in addition to improvement in managerial and motivational activities (Atif et al., 2021; Dezso & Ross, 2012; Firmino & Peixoto, 2023). This finding assumes the social identity theory, which has its origin in psychology, recognizing similar behaviors for people belonging to the same social group, given the sense of belonging to the installed environment, identifying similarities and differentiating themselves from other groups (Turner et al., 1987).

Gender diversity was the subject of the study by García-Sánchez et al. (2019), which analyzed the relationship between the presence of women on the Board of Directors and the quality of sustainability reports, using as metrics the four determining aspects of GRI in a sample of companies from information available from two databases, Thomson Reuters Eikon and Ethical Investment Research Services (EIRIS), belonging to 12 different countries (Canada, France, Germany, Hong Kong, Japan, Luxembourg, Netherlands, Singapore, Spain, Switzerland, the United Kingdom, and the United States). The research results demonstrated that Boards of Directors with greater female representation presented fewer impression management strategies in disclosures.

Thus, García-Sánchez et al. (2019) highlight a research gap regarding the Brazilian business reality. Given the

mentioned context, the research proposes the following problem: what is the relationship between gender diversity on the Board of Directors of companies belonging to the Corporate Sustainability Index of Brasil, Bolsa, Balcão (B3) and the information quality of sustainability reports? Thus, the study's objective is to analyze the relationship between gender diversity on the Board of Directors of companies included in the Corporate Sustainability Index (ISE) of B3 and the information quality of sustainability reports, in the period from 2014 to 2021.

The present research fosters the debate on the quality of accounting information in voluntary disclosures with a focus on the composition of the Board of Directors, being an adapted replication of García-Sánchez et al. (2019). The influence of board characteristics on the quality of report disclosure was also analyzed by Portácio et al. (2022), whose results showed that gender diversity on the board positively affects the readability of annual reports. Furthermore, it assists in understanding empirical evidence that demonstrates behavior linked to a specific country without regulation on sustainable disclosures with emphasis on the relationship between the proportion of women on boards of directors and the quality of reported information. The analysis of this relationship brings results about which aspects of GRI still need to be worked on in the presentation of sustainability reports for Brazilian companies.

## 2 Theoretical Framework

The disclosure of information faithful to the financial and equity reality of organizations is the main objective of accounting disclosures (Iudícibus, 2006). Although it contains a normative source, accounting has discretionary spaces that allow the use of professional judgment – emphasizing substance over form – and should be used to improve the quality of reported information (Gelbcke et al., 2018). The existing discretion in accounting finds space in voluntary disclosure, building a union between the conception of incentives that lead managers to disclose or not disclose non-mandatory information (Lim et al., 2018; Verrecchia, 2001). Thus, voluntary disclosure is an instrument for mitigating information asymmetry, being able to significantly influence the relevance, timeliness, and quality of information reporting (Healy & Palepu, 2001; Kothari et al., 2009).

Information quality can be assessed from various aspects and characteristics, assuming different connotations for various users, which makes it a product of the accounting environment (Armstrong et al., 2010; Dechow et al., 2010). The subjectivity of this concept is the result of the discretionary space created by accounting information, which encourages investigation and understanding of the informational construction made available by companies to the market (Beisland & Hamberg, 2013; Delone & McLean, 2003; Kothari, 2001; Lopes & Martins, 2005). In this sense, there are economic incentives for accounting information to be reliable, but there is also the possibility of bias in disclosure, with voluntary disclosure being the main driver of narrative rationalization (Grüning, 2011). The various themes encompassed in a single concept create opportunities for voluntary disclosure, as it adds to mandatory disclosure statements information that provides greater competitive advantage and information quality (Ball, 2006; Barron & Waymire, 2004). Market competitiveness functions as a mechanism to foster company growth, increasing executives' commitment in preparing information made available to stakeholders, and reducing agency costs (Nickell, 1996).

Stakeholders also represent a strategic tool for companies, as they have the power to affect and/or be affected by the organizational objectives (Freeman, 1984). Thus, organizations understood that mandatory disclosures were not sufficient to keep stakeholders satisfied and, consequently, instigating market competitiveness (Schaltegger, 2012). Group satisfaction came to depend not only on financial information, but also on the way social and environmental issues are being addressed, contributing more effectively to company valuation (Donaldson & Preston, 1995; Forcadell & Aracil, 2017). Stakeholder theory presents elements to investigate and deepen the existing relationships in different component groups of the capital market, involving various stakeholders, such as boards and directors, focusing on the link of such relationships, mainly, with social aspects of organizational composition in different scales of governance (Wood & Jones, 1995). Thus, information quality began to have new performance measures, such as social and environmental ones, measuring how much companies are meeting expectations and aligning their economic dividends with such information provided voluntarily (Freeman et al., 2010).

The improvement of information quality must have the capacity to influence the price of shares and, consequently, the decision-making process (Beaver, 1998). The effects of financial disclosures on the structuring and composition of the board on the accounting information quality of companies listed on the Brazilian stock exchange were investigated by Holtz and Sarlo Neto (2014). The research sample included the years from 2008 to 2011 from annual reports and reference forms made available by the Brazilian Securities Commission (CVM). In the article, multiple regression was used. Using BMF&Bovespa's Informativeness of Profits, the authors showed that the independence of board members and the separation of the positions of board chairman and chief executive officer positively influence information quality.

Still in the context of information quality, Portácio et al. (2022) analyzed the influence of gender diversity on the Board of Directors on the readability of annual reports. The sample included 88 of the 100 largest market-valued companies that had their reports in English in 2020. Using the Flesch index, the results demonstrated that gender diversity on the board positively affects the readability of annual reports, concluding that the presence of women in senior management positions contributes to improving information quality, as they have a more ethical, communicative, and transparent behavior. The authors also found that boards with greater numbers of participants publish more extensive reports, which can compromise information quality.

The discussion about the influence of gender diversity on decision-making comes from Social Identity Theory, which has its origin in psychology, seeking to elucidate the multiple facets of different social groups, whether attributed to individual or group behaviors (Hogg & Abrams, 1988). Interpersonal skills developed by the female gender are characterized by a more understanding, inclusive, and service- and achievement-oriented vision (Eagly & Johnson, 1990). In this aspect, the positive influence of women in senior management positions on business behavior of boards was analyzed by Ibrahim and Angelidis (1995), showing the adoption of ethical and caring measures, differently from male behavior. It is also believed that female directors are less prone to manipulate information in disclosures. Acting as observers and communicators in boards, making management more participatory, democratic, and community-oriented (Eagly & Johnson, 1990; Ho et al., 2014; Sidani et al., 2015).

The impact of female directors on the contributions and results of North American companies was the subject of analysis by Adams and Ferreira (2009), identifying that female directors are more assiduous than male directors in attending board and committee meetings. Additionally, the results showed that Chief Executive Officers (CEOs) receive higher compensation return when their boards have greater female participation. However, the study also demonstrated that the average effect of gender diversity can be negative on company performance when there is a mandatory gender quota, which can reduce company value.

Gender diversity was also analyzed with financial restatement in the research by Abbott et al. (2012), raising hypotheses that there was a negative relationship between female presence and the probability of an eventual financial restatement. Through US General Accounting Office reports, a sample of 278 companies was separated and conditional logistic regressions were performed, finding a significant association between the presence of at least one woman on the board and lower probability of restatement. The results thus showed the beneficial impact of female presence in board governance functions.

In a sample with companies from various countries in North America and Europe, García-Sánchez et al. (2019) analyzed 273 observations from the years 2006 to 2014, collecting financial data from two databases: Thomson Reuters Eikon and Ethical Investment Research Services. Through the collection of such information, five models were developed, one for each GRI pillar, and finally, in a single modeling, the values found in the first five equations were taken for each company in the sample. The study found that the presence of women on boards of directors, mainly in supervisory positions, decreases impression management of sustainable information disclosed by companies. Thus, women are positively associated with more balanced, comparable, and reliable results, and negatively associated with more accurate and clear information, as they have a more narrative personality.

It should be noted that the four determinants of voluntary sustainable disclosure are balance, accuracy and clarity, comparability, and reliability, which are the basis for the hypotheses of this study, and are explained by Henry (2008), Rogers et al. (2011), Franco et al. (2015), Melloni et al. (2017), and García-Sánchez et al. (2019). Balance represents the level of optimism found in information, counterbalancing optimistic and pessimistic words. Accuracy and clarity analyze the length of the report so that it is more concise and useful. Comparability requires companies to disclose information systematically, enabling stakeholders to analyze the evolution of information and business performance. Reliability refers to the assurance contained in statements, assuming that a third party was able to form an opinion about the statements and that it is free from errors.

Given the empirical studies developed in the area, the adapted replication of the study by García-Sánchez et al. (2019) to the Brazilian reality, the following research hypotheses were developed:

Hypothesis 1 (H1): There is a significant positive relationship between the proportion of women on the Board of Directors and the information quality of sustainability reports.

Hypothesis 1a (H1a): There is a significant positive relationship between the proportion of women on the Board of Directors and the balance of sustainability reports.

Hypothesis 1b (H1b): There is a significant positive

relationship between the proportion of women on the Board of Directors and the comparability of sustainability reports.

Hypothesis 1c (H1c): There is a significant positive relationship between the proportion of women on the Board of Directors and the reliability of sustainability reports.

Hypothesis 1d (H1d): There is a significant negative relationship between the proportion of women on the Board of Directors and the accuracy and clarity of sustainability reports.

Furthermore, Atif et al. (2021) analyzed the presence of women on administrative boards, finding a positive relationship between their presence and sustainable energy consumption. Also, Firmino and Peixoto (2023) investigated the relationship of women on boards of directors of Brazilian companies and their adherence to the Carbon Efficient Index (ICO2). The relationship found was positive and significant, that is, the presence of women on the board increases the probability of the company adhering to ICO2.

On the other hand, Abreu et al. (2023), when investigating the impact of board diversity on the environmental policy of companies located in Brazil, Mexico, and Chile, inferred that board heterogeneity does not exert significant influence on Corporate Social Responsibility (CSR) activities. According to the authors, this absence of effect stems from the fact that, in the Latin American context, environmental issues tend to be considered only from the perspective of use and preservation of natural resources, while more strategic dimensions, such as environmental innovation and emissions reduction, are rarely incorporated into the corporate agenda.

In a complementary way, Husted and Sousa Filho (2019), when analyzing the relationship between board structure and the disclosure of environmental, social, and governance (ESG) information in Latin American companies, identified a counterintuitive result: the presence of women on boards would be associated with a negative impact on the level of ESG disclosure. These findings suggest that, in the regional context, both gender diversity and structural diversity of boards do not yet translate, in a consistent manner, into greater organizational commitment to sustainability and transparency practices.

## 3 Methodological Procedures

Regarding the problem approach, the research is quantitative, descriptive in terms of objective, and documental in terms of technical procedures (Anderson & Widener, 2006). The study population was 40 companies delimited by those included in the Corporate Sustainability Index (ISE) of B3 in 2021. The sample resulted in 33 companies and 244 observations, covering their reports and accounting information in the period from 2014 to 2021. Thus, for 7 companies it was not possible to transform the reports into ".txt" and/or they could not be read by Python software due to the disclosed format or file protection. The period is justified by the fact that in 2013 the Integrated Reporting framework was developed, with the first structuring regarding reports with sustainable narrative information, translated into Portuguese in 2014.

The research data were obtained as follows: i) balance, comparability, reliability, accuracy, clarity, and Big Four were collected from the annual reports of the sample companies; ii) composition of the board of directors, CEO presence, and board size were extracted from the Reference Forms referring to October 2022; iii) company size, sector of operation, and participation in the ISE portfolio were obtained from the B3 website; and iv) revenue, indebtedness, and return on assets were collected from the Comdinheiro platform. The metrics used for these variables, as well as their analysis procedures, as addressed in the literature, are described in Table 1.

Table 1
**Research Variables**

| Variable | Acronym | Method | Metric | Theorical Basis | Expected Signal |
|---|---|---|---|---|---|
| **Dependent** | | | | | |
| Balance | TOM | Narrative tone | TOM = (∑ Positive Words - ∑ Negative Words) / (∑Positive Words +∑ Negative Words | Henry (2008) and Carlsson and Lamti (2015) | N.A. |
| Comparability | CPB | Adherence to GRI summary | Dummy presenting 1 for reports adherent to GRI summary and 0 for non-adherent | García-Sánchez et al. (2019) | N.A. |
| Reliability | AUD | Audit in Sustainability Reports | Dummy presenting 1 for audited reports and 0 for non-audited | Gomes (2012), Pastre et al. (2015) and Santos et al. (2018) | N.A. |
| Accuracy and Clarity | LEG | Report Readability | Flesch Textual Complexity Index = 248.835 - (1.015 x ASL) - (84.06 x ASW) | Flesch (1948), Martins et al. (1996), Rodrigues et al. (2013) and Borges and Rech (2019) | N.A. |
| **Explanatory** | | | | | |
| Board of Directors Composition | CA_FEM | CVM Reference Form | Proportion of women on the board of directors | García-Sánchez et al. (2019) | + |
| | CA_MAS | | Proportion of men on the board of directors | | - |
| **Control** | | | | | |
| B3 Sustainability Index | ISE | Brasil, Bolsa, Balcão (B3) | Dummy presenting 1 for companies remaining in the index and 0 for non-participants | Hassel et al. (2005) | + |
| Chief Executive Officer | CEO | CVM Reference Form | Dummy presenting 1 for companies with female CEO and 0 for other companies | Adams and Ferreira (2009), Sprenger et al. (2017) and Cardoso (2021) | + |
| Board of Directors Size | TAM_CA | CVM Reference Form | Number of Directors | Holtz and Sarlo Neto (2014) | + |
| Big Four | AUD_B4 | Audit Report | Categorical variable for Big Four audit firms, with non-Big Four audited as reference | Velozo et al. (2014) and Santos et al. (2018) | + |
| Indebtedness | END | Comdinheiro Platform | Liabilities/Total Assets | García-Sánchez et al. (2019), Berchicci and King (2021) and Xue et al. (2022) | - |
| Return on Assets | ROA | Comdinheiro Platform | Operating Income / Total Assets | García-Sánchez et al. (2019); Silva and Lucena (2019). | + |
| Revenue | REC | Comdinheiro Platform | Natural logarithm of Revenue | García-Sánchez et al. (2019) | + |
| Company Size | TAM | Asset Size | Natural logarithm of Total Assets | Portácio et al. (2022) | + |
| Sector of Operation | SET | Brasil, Bolsa, Balcão (B3) Classification | Dummy presenting 1 for sector of operation and 0 for others | Hassel et al. (2005) | +/- |
| Covid | COV | Period indicated by the World Health Organization | Dummy indicating 1 for period of 2020 and 2021 and 0 for others | Eigenstuhler et al. (2021) | - |

Source: Prepared based on various authors.
Note: N.A. = not applicable; ASL = average sentence length; ASW = average number of syllables per word; GRI = sustainable standards developed by the Global Reporting Initiative; CVM = Brazilian Securities Commission.

The dependent variables of the study are: i) balance (TOM) - measured by Henry's (2008) equation using Python software that was programmed to identify the tendency of positive and negative words, categorized by Henry's (2008) dictionary, complemented by Carlsson and Lamti (2015) and translated into Portuguese validated by Cavalheiro (2019) with validation by three experts. The equation result ranges from -1 to 1, demonstrating positive bias for values greater than 0 and negative bias for values less than 0, with 0 indicating neutral report construction; ii) comparability (CPB) - dummy of adherence to GRI summary in reports – which aim to standardize the reported sustainable information; iii) reliability (AUD) - dummy through audited or non-audited reports; iv) accuracy and clarity (LEG) - measured through Readability® software, which provides information about document readability, such as total number of words, syllables, and sentences, which can make reading documents easier or more difficult, depending on the intention when publishing the document. Subsequently, the data were included in the Flesch Index equation adapted to the Brazilian dictionary (Borges & Rech, 2019; Rodrigues et al., 2013), which results in values that, the higher they are, the less complex the document reading is.

The explanatory variable is the Board of Directors composition, divided between male composition (CA_MAS) and female composition (CA_FEM), demonstrating the board proportion for each gender. Other variables of interest are dummy participation in the B3 sustainability index (ISE), 1 for companies belonging to the portfolio and 0 for non-belonging, dummy Chief Executive Officer (CEO), being 1 for boards chaired by women and 0 for boards chaired by men, Board of Directors size (TAM_CA), represented by the number of board members in a given year according to the Reference Form made available by CVM, Big Four (AUD_B4), as a categorical variable for each of the companies listed as the four largest audit firms, indebtedness (END), calculated by the proportion of liabilities in the company's total assets, return on assets (ROA), demonstrated by the proportion of operating income over assets, revenue (REC), calculated by the natural logarithm of revenue. Finally, the control variables are company size (TAM), calculated through the natural logarithm of assets, sector of operation (SET) according to classification made by B3, and Covid (COV) treated as dummy, 1 for pandemic periods (2020 and 2021) and 0 for others .

The data were analyzed through descriptive statistics and multiple regression, with panel data by Ordinary Least Squares (Anderson & Widener, 2006). For the research operationalization, Equations 1 and 2 were proposed, analyzing the results for both the proportion of men and the proportion of women on the Board of Directors.

$$CQI_{it} = a + \beta_1(CA\_FEM_{it}) + \beta_2(ISE_{it}) + \beta_3(CEO_{it}) + \beta_4(TAM\_CA_{it}) + \beta5(AUD\_B4_{it}) + \beta_6(END_{it}) + \beta_7(ROA_{it}) + \beta_8(REC_{it}) + \beta_9(TAM_{it}) + \beta_{10}(SET_{it}) + \beta_{11}(COV_{it}) + \varepsilon_{it} \quad (1)$$

$$CQI_{it} = a + \beta_1(CA\_MAS_{it}) + \beta_2(ISE_{it}) + \beta3(CEO_{it}) + \beta4(TAM\_CA_{it}) + \beta5(AUD\_B4_{it}) + \beta_6(END_{it}) + \beta7(ROA_{it}) + \beta8(REC_{it}) + \beta_9(TAM_{it}) + \beta_{10}(SETit) + \beta_{11}(COV_{it}) + \varepsilon_{it} \quad (2)$$

Where:

$CQI_{it}$ = balance, comparability, reliability, accuracy and clarity;
$CA\_FEM_{it}$ = roportion of women on the board composition of company i at time t;
CA_MASit = proportion of men on the board composition of company i at time t;
$ISE_{it}$ = dummy indicating whether company i at time t was part of the index portfolio, assuming value 1, and 0 when not part of it;
$CEO_{it}$ = dummy with value 1 for female CEO and 0 for male CEO of company i;
$TAM\_CA_{it}$ = number of board of directors' members of company i at time t;
$AUD\_B4_{it}$ = categorical variable according to the firm that audited company i at time t;
$END_{it}$ = liabilities/total assets of company i in period t;
$ROA_{it}$ = net income/total assets of company i in period t;
$REC_{it}$ = revenue of company i in period t, measured by the natural logarithm of revenue;
TAMit = size of company i at time t, measured by the natural logarithm of total assets;
$SET_{it}$ = categorical variable according to the classification of company i;
$COV_{it}$ = dummy with value 1 for period t affected by COVID and 0 for others for company i.

Additionally, Kruskal-Wallis mean tests were performed, as well as compliance tests related to multicollinearity (for no variable it was above 10), heteroscedasticity (0.55), and autocorrelation (0.15), using the Variance Inflation Factor (VIF), Modified Wald test, and Wooldridge test, respectively (Wooldridge, 2010), thus all assumptions were met and it was not necessary to use robustness in the regression. For outlier control, winsorization from 1% to 99% was performed for continuous research variables. To define the models between fixed effects and random effects, Chow F test, Breusch-Pagan Lagrangian Multiplier, and Hausman tests were performed, determining which was most significant in relation to the Pooled model (Anderson & Widener, 2006).

# 4 Data Analysis and Interpretation

### 4.1 Analysis of Descriptive Statistics of Variables

The descriptive analysis of the study variables is presented in Table 2, showing the means ($\mu$) of the data worked globally and in a segregated manner according to the ISE dummy classification.

Table 2
**Descriptive statistics of non-binary variables**

| Variables | μ | μ ∈ ISE | μ ∉ ISE | σ | Min | Max |
|---|---|---|---|---|---|---|
| TOMit | 0.3371 | 0.3375 | 0.3357 | 0.1782 | -0.0435 | 1.0000 |
| LEGit | 2.0704 | **1.9389** | **2.4754** | 1.1650 | -3.4039 | 5.3713 |
| CA_FEMit | 0.1375 | **0.1480** | **0.1022** | 0.1215 | 0.0000 | 0.4285 |
| CA_MASit | 0.8624 | **0.8518** | **0.8978** | 0.1215 | 0.5714 | 1.0000 |
| TAM_CAit | 8.9713 | 8.9096 | 9.1786 | 2.0894 | 3.0000 | 1,5.0000 |
| ENDit | 0.9392 | **1.0159** | **0.6818** | 0.9956 | 0.0105 | 4.5144 |
| ROAit | 4.2988 | **4.7036** | **2.9397** | 5.5661 | -14.3734 | 41.2466 |
| RECit | 23.2793 | 23.1158 | 23.8281 | 2.9522 | 0.0000 | 26.8384 |
| TAMit | 24.4871 | 24.5751 | 24.1919 | 1.5790 | 21.8238 | 28.3582 |

Note: $\mu$: means; $\mu \in$ ISE: means of companies belonging to the ISE portfolio; $\mu \notin$ ISE: means of companies not belonging to the ISE portfolio; σ: standard deviation; Min = minimum values; Max = maximum values; TOMit: Balance of reports of company i at time t; LEGit: Accuracy and clarity of reports of company i at time t; CA_FEMit: Proportion of women on the board of directors of company i at time t; CA_MASit: Proportion of men on the board of directors of company i at time t; TAM_CAit: Size of the board of directors of company i at time t; ENDit: Indebtedness of company i at time t; ROAit: Return on assets of company i at time t; RECit: Revenue of company i at time t; TAMit: Size of company i at time t.

The accuracy and clarity variable (LEG), which uses the readability of sustainability reports as a metric, demonstrates different behavior when analyzing the company's inclusion in the ISE portfolio. The results show greater textual complexity of reports for observations of periods when the company belongs to the ISE portfolio, and lower complexity when it does not belong, since the higher the value found, the easier the document reading becomes. The board of directors' composition also shows variation, with the mean of women tending to increase in companies included in the ISE ($\mu$ 0.1480), however, according to the research by Adams and Ferreira (2009), the effect of gender diversity can be significant and negative on company performance when such diversity is fulfilled as a requirement.

Furthermore, it is observed that both indebtedness and return on assets are higher on average for companies belonging to the ISE portfolio, showing that stakeholder satisfaction does not depend only on mandatory information, but rather, is linked to voluntary disclosure, not depending only on financial information and contributing to greater company valuation (Donaldson & Preston, 1995; Forcadell & Aracil, 2017). Thus, it is demonstrated that companies included in the portfolio require greater third-party resources, that is, they use the inclusion to finance themselves in the market, concomitantly with their internal return, which is also higher when included in the index.

Analyzing the results regarding the mean readability of reports and the board of directors' composition, it is noted that companies belonging to the ISE have greater textual complexity in reports and greater representation of women on the board of directors. These findings are contrary to Portácio et al. (2022), in which gender diversity on administrative boards is positively related to the readability of annual reports. Nevertheless, the results are congruent with García-Sánchez et al. (2019), which showed that boards with female participation are negatively associated with accurate and clear information, with report readability being compromised due to the narrative personality of the female gender. It should be noted that company size and revenue did not show significant changes, thus demonstrating that the sample did not show large divergences in firm size.

For the binary variables, reliability (AUD), comparability (CPB), and CEO showed results to be highlighted. Of the total sample, 18.11% do not have specific audit for their sustainability reports, and 6.58% are not adherent to the GRI summary for preparing such reports. Of the 244 observations, 19 (7.78%) refer to companies with female CEO in the analyzed period. The CEO variable also brought results regarding the board

of directors' composition, since the data demonstrate that when the CEO is male the board tends to have a predominantly male composition, while when the CEO is female the board tends to have composition with greater female representation. Approximately 30% of the analyzed Boards of Directors do not have any women in their composition. Furthermore, the highest female representation on Boards is 42.85%, while of the 33 companies belonging to the sample, 20 of them presented, in some of the observations, a Board of Directors composed only of men.

In addition to analyzing the reliability variable as dummy for companies with audited or non-audited sustainability reports, the study used as a categorical variable the indication of the audit firm when these are one of the four largest audit firms worldwide. The results found are presented in Table 3.

Table 3
**Descriptive statistics of variables by audit firm**

| | Deloitte | | EY | | KPMG | | PwC | |
|---|---|---|---|---|---|---|---|---|
| Varáveis | μ | σ | μ | σ | μ | σ | μ | σ |
| TOMit | **0.1442** | 0.0956 | 0.3799 | 0.2241 | 0.3433 | 0.1606 | 0.3546 | 0.2195 |
| LEGit | **1.8379** | 0.4385 | 2.3605 | 0.9317 | **1.7083** | 1.1879 | 2.2160 | 1.5296 |
| CA_FEMit | **0.2907** | 0.1159 | 0.1756 | 0.1520 | 0.1261 | 0.1139 | 0.2001 | 0.1051 |
| CA_MASit | 0.7093 | 0.1159 | 0.8244 | 0.1520 | 0.8739 | 0.1139 | 0.7999 | 0.1052 |
| TAM_CAit | 8.7273 | 1.3484 | 8.7857 | 2.5474 | 9.1099 | 2.1419 | 8.7000 | 2.3880 |
| ENDit | **1.9004** | 1.8345 | 0.5353 | 0.1756 | **1.0683** | 1.0605 | 0.9482 | 1.3847 |
| ROAit | 4.1686 | 3.1505 | 4.9038 | 4.4364 | 4.0900 | 6.0947 | 6.2948 | 5.7721 |
| RECit | 24.1412 | 0.9896 | 23.7491 | 0.8587 | 22.9375 | 4.4861 | 23.7405 | 1.8446 |
| TAMit | 25.6109 | 1.8396 | 24.2629 | 0.8384 | 24.6950 | 1.7662 | 25.4104 | 1.7775 |

Note: μ: means; σ: standard deviation; TOMit: Balance of reports of company i at time t; LEGit: Accuracy and clarity of reports of company i at time t; CA_FEMit: Proportion of women on the board of directors of company i at time t; CA_MASit: Proportion of men on the board of directors of company i at time t; TAM_CAit: Size of the board of directors of company i at time t; ENDit: Indebtedness of company i at time t; ROAit: Return on assets of company i at time t; RECit: Revenue of company i at time t; TAMit: Size of company i at time t.

The descriptive statistics presented in Table 3 show some variations in the means of variables when analyzed by audit firm. It is observed that the accuracy and clarity variable (LEG) presents higher values for Deloitte and KPMG companies, which means that the reports audited by these companies present greater readability. These observations are also from companies that present greater indebtedness. Textual balance, analyzed by the tone of reports, demonstrates half the value for reports audited by Deloitte, which suggests that these are closer to neutrality than the rest of the sample.

### 4.2 Analysis of the Relationship between Gender Diversity in Board of Directors Composition and the Information Quality of Sustainability Reports

Table 4 shows by model the regression analysis performed for each of the study's dependent variables, according to explanatory and control variables (Table 1).

Table 4
**Relationship between Board of Directors Composition and Information Quality**

| | TOM | | LEG | | AUD | | CPB | |
|---|---|---|---|---|---|---|---|---|
| | Coef | p-value | Coef | p-value | Coef | p-value | Coef | p-value |
| CA_FEMit | -0.055 | 0.625 | 0.818 | 0.334 | 2.318 | 0.184 | 2.085 | 0.485 |
| ISEit | 0.027 | 0.423 | **-0.639*** ** | **0.008** | 0.481 | 0.245 | 0.607 | 0.357 |
| CEOit | -0.022 | 0.656 | 0.080 | 0.827 | 0.416 | 0.619 | -0.640 | 0.594 |
| TAM_CAit | -0.002 | 0.772 | -0.058 | 0.250 | -0.041 | 0.680 | -0.203 | 0.152 |
| ENDit | 0.013 | 0.593 | 0.066 | 0.688 | -0.369 | 0.289 | 0.457 | 0.223 |
| ROAit | -0.001 | 0.601 | 0.019 | 0.321 | 0.038 | 0.283 | 0.017 | 0.784 |
| RECit | 0.000 | 0.912 | -0.027 | 0.336 | **-0.689**** | 0.029 | -0.580 | 0.288 |
| TAMit | -0.013 | 0.391 | -0.034 | 0.739 | **1.019***** | 0.001 | -0.173 | 0.677 |
| COVt | -0.022 | 0.386 | **-0.380**** | **0.040** | 0.496 | 0.333 | **1.898*** | **0.084** |
| Panel | Random Effects | | Random Effects | | Logistics | | Logistics | |
| Sector Control | Yes | | Yes | | Yes | | Yes | |
| Year Control | Yes | | Yes | | Yes | | Yes | |
| Overall $R^2$ | 0.0230 | | 0.0942 | | | | | |
| Between $R^2$ | 0.0526 | | 0.0889 | | 0.1430 | | 0,1961 | |
| Within $R^2$ | 0.0117 | | 0.0881 | | | | | |
| Observations | 244 | | 204 | | 243 | | 243 | |

Note: TOM: balance in the tone of reports; LEG: report readability; AUD: report reliability, whether audited or not; CPB: report comparability, analyzed by adherence to GRI summary; CA_FEMit: Proportion of women on the board of directors of company i at time t; ISEit: company i in the ISE portfolio at time t; CEOit: Female CEO in company i at time t; TAM_CAit: Size of the board of directors of company i at time t; ENDit: Indebtedness of company i at time t; ROAit: Return on assets of company i at time t; RECit: Revenue of company i at time t; TAMit: Size of company i at time t; COVt: Period affected by Covid incidence; and ***, **, *: statistically significant at 1%, 5%, and 10%, respectively.

According to Table 4, the Balance (TOM) and accuracy and clarity (LEG) models were analyzed through regression with Random Effects, which proved to be more adequate after performing the Chow F test, Breusch-Pagan Lagrangian Multiplier, and Hausman test. The reliability (AUD) and comparability (CBP) variables were analyzed by logistic regression, significant at 14.30% and 19.61%, respectively.

The explanatory variables linked to the proportion of women (CA_FEM) and men (CA_MAS) in the board of directors' composition did not show variation in the model application, as they are complementary variables, closing the proportion at 100%. Thus, priority was given to presenting the results of the female gender model (CA_FEM), in which it is noted that the relationship is not significant for any of the variables. The hypotheses of this study cannot be accepted, since the board of directors' composition regarding gender does not significantly influence the information quality of reports through the proxies used in the research. Thus, it does not corroborate Social Identity Theory, which seeks to explain how different social categories, with different interpersonal skills, can influence the presentation of company results, as well as the services provided (Eagly & Johnson, 1990; Hogg & Abrams, 1988).

In general, the results are opposite to the findings of García-Sánchez et al. (2019), which showed a significant and positive relationship between boards of directors composed of women and the comparability, balance, and reliability of information reporting in other international contexts. In the Brazilian sample, both the board of directors' composition variable regarding female gender and the CEO gender variable did not present statistical significance in the regression tests performed. That is, the finding is contrary to Portácio et al. (2022), who concluded that female CEOs positively affect the improvement of information quality.

The results obtained in this study corroborate the findings of Abreu et al. (2023), who did not identify statistical significance for female presence on boards of directors in relation to CSR activities in companies from Brazil, Mexico, and Chile. Similarly, the evidence presented here reveals null effects, that is, women's participation on boards does not prove statistically significant, either positively or negatively. In contrast, Husted and Sousa Filho (2019) identified negative statistical significance, suggesting that female presence on boards would be associated with a reduction in the level of disclosure of environmental, social, and governance (ESG) information. Additionally, the accounting comparability variable (CPB) did not present statistical significance in relation to board of directors' size (TAM_CA), reinforcing the absence of robust evidence supporting a relationship between these dimensions in the analyzed context.

The ISE variable is significant and negative (-0.639) at 1% for readability (LEG). Considering that readability is measured on a scale where the higher the result, the better the textual understanding, it is observed that companies included in the ISE tend to disclose more textually complex reports. Furthermore, the ISE variable showed significant correlation at 1% with the comparability and audit variables, although in the regression model it was significant only for the readability variable.

The Covid variable is significant and negative at 5% for the Readability variable (LEG) and significant and positive at 10% in relation to comparability (CPB), which demonstrates that in periods affected by the Covid-19 pandemic the reports disclosed by companies proved to be more complex than in periods not affected by the pandemic situation and with increased comparability of companies' sustainability reports, measured by adherence to GRI summary.

Size (TAM) showed a significant and positive relationship at 1% with reliability (AUD). That is, larger companies are more likely to hire specific audit for the sustainability report when compared to smaller companies. Nevertheless, companies' revenue (REC) has a significant and negative relationship at 5% with the reliability of sustainability reports.

## 6 Final Considerations

The research analyzed the relationship between gender diversity on boards of directors and the information quality of annual reports of companies belonging to the B3 ISE portfolio in 2021, in the period from 2014 to 2021, considering when the company was or was not in the portfolio during the defined timeframe. The information quality metric was analyzed by four variables based on GRI pillars: accuracy and clarity, balance, reliability, and comparability. The present research is an adaptation of García-Sánchez et al. (2019), which showed that the presence of women on the board of directors influenced the improvement of information quality in the period from 2006 to 2014. Unlike this study, the present research did not accept the hypotheses, given that it did not find significance

in the applied models between the board composition regarding gender and the variables of balance, accuracy and clarity, reliability, and comparability.

The ISE variable, which measured whether the company was included in the Corporate Sustainability Index portfolio, proved significant for the dependent variable readability, showing that included companies tend to disclose more complex sustainability reports. It should also be noted that descriptive statistics revealed that companies with female CEOs tend to have boards of directors with greater female participation and that, consequently, these boards are associated with companies that are ISE members. Unlike other research that seeks to differentiate between audits performed or not by large audit firms (Big Four), the present research added the variable as categorical, seeking specific results by firm. Notably, Deloitte and KPMG companies are related to audited companies with clearer and more concise reports and to companies with greater indebtedness.

Regarding the analyses in relation to the control variables used, the results found for return on assets and indebtedness draw attention. Considering that return on assets reflects the company's operational performance, descriptive statistics show that companies belonging to the ISE portfolio present higher returns. This result is aligned with the behavior of the indebtedness variable, which also presents a higher mean for companies belonging to the ISE. Such a scenario suggests that these organizations tend to raise more resources in the market, being able to use their presence in the portfolio as a legitimation factor before stakeholders, since compliance with sustainability metrics can strengthen their credibility and attractiveness to investors and other interested publics.

Based on the research results, in a theoretical analysis, the study fosters debate about the existing effects of women's presence in the market and the reported information quality. Although the research results diverge from related studies, they are coherent with what is expected from the market, in which specific gender issues should not be factors of difference regarding information reporting quality. As a limitation, the sample stands out, given the use of the ISE portfolio as a form of research delimitation. Furthermore, part of the reports made available by companies had security parameters that did not allow conversion of the ".pdf" file to ".txt", excluding the observation from the sample.

Given the findings, future research can expand the temporal and sectoral scope, to verify whether the absence of statistical significance found between gender diversity on boards and the information quality of reports is maintained in different periods and in other B3 segments beyond the ISE portfolio. It is also suggested to incorporate additional metrics of information quality and sustainability, such as indicators aligned with the new standards of the International Sustainability Standards Board (ISSB) and integrated reports, to capture more recent and complex dimensions of corporate disclosure. Another relevant line of investigation consists of exploring the interactive effects between gender diversity and other governance mechanisms, such as board independence, CEO duality, and specialization of audit committees, since the influence of diversity may emerge jointly and not in isolation. Moreover, comparative studies between Latin American countries, with different institutional and cultural contexts, can bring evidence about the generalization or specificity of results. Finally, it is also recommended to use more advanced natural language processing methodologies, capable of overcoming the technical limitations faced in this study, such as the conversion of protected files, ensuring greater scope and precision in the textual analysis of corporate reports.

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