# CORPORATE CHARACTERISTICS RELATED TO DISCLOSURE OF NON-FINANCIAL CAPITAL

Maria das Graças Teixeira de Souza e Rocha [1]
Denise Mendes da Silva [2]
Dermeval Martins Borges Júnior [3]

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## ABSTRACT

This study aims to examine the relationship between corporate characteristics and the disclosure of non-financial capital, namely: natural, social and relationship, human and intellectual, in the integrated reports of Brazilian listed companies. The research was based on disclosure theory. We analyzed 26 companies listed on B3 that adopted integrated reporting in accordance with the IIRC framework, and which had a continuous frequency in their disclosure publications in the period between 2016 and 2020. The analyses involved descriptive statistics and linear regression models. The main results indicated that the size of the firms, the sector in which they operate, and the level of indebtedness are determining characteristics of the disclosure of intellectual, social and relationship and natural non-financial capitals. It is understood that this research strengthens discussions about the proposal for international standardization of voluntary disclosure, as well as meeting the needs of investors and other interested parties in terms of knowledge of the characteristics that influence the disclosure of non-financial capital.

**Keywords:** Integrated reporting. Non-financial capitals. Voluntary disclosure. Corporate characteristics.

[1] Master's in Accounting from the Federal University of Uberlândia (UFU). Professor at the State University of Montes Claros (UNIMONTES). Address: Av. José Calos de Pinho, 277 - Betel, Salinas-MG, 39560-000. Phone: (38) 99946-9666. E-mail: galsalinas@yahoo.com.br
https://orcid.org/0000-0001-5462-4781

[2] PhD in Controllership and Accounting from the University of São Paulo (USP). Professor at the Federal University of Uberlândia (UFU). Address: Av. João Naves de Ávila, 2121 - Santa Mônica, Uberlândia-MG, 38408-100. Phone: (34) 3239-4176. E-mail: denise.mendes@ufu.br
https://orcid.org/0000-0002-1490-5148

[3] PhD in Accounting and PhD in Business Administration, both from the Federal University of Uberlândia (UFU). CAPES/Brazil scholarship holder. Professor at the Federal University of Goiás (UFG). Address: Av. Esperança, s/n – Samambaia Campus, Goiânia-GO, 74690-900. Phone: (62) 3521-1390. E-mail: dermeval.junior@ufg.br
https://orcid.org/0000-0003-2279-449X

# CARACTERÍSTICAS CORPORATIVAS RELACIONADAS À DIVULGAÇÃO DE CAPITAIS NÃO FINANCEIROS


## RESUMO

O objetivo deste estudo é examinar a relação entre características corporativas e a divulgação de capitais não financeiros, a saber: natural, social e de relacionamento, humano e intelectual, em relatos integrados das companhias abertas brasileiras. A pesquisa teve como fundamento a teoria da divulgação. Foram analisadas 26 empresas listadas na B3 que adotaram o relato integrado em conformidade ao *framework* do IIRC, e que tiveram uma frequência contínua em sua publicação no período compreendido entre 2016 e 2020. As análises envolveram estatísticas descritivas e modelos de regressão linear. Os principais resultados indicaram que o tamanho das firmas, o setor de atuação e o nível de endividamento são características determinantes da divulgação dos capitais não financeiros intelectual, social e de relacionamento e natural. Entende-se que esta pesquisa fortalece as discussões acerca da proposta de padronização internacional da evidenciação voluntária, bem como atende às necessidades de investidores e demais partes interessadas em termos de conhecimento das características que influenciam a divulgação dos capitais não financeiros.


**Palavras-Chave:** Relato integrado. Capitais não financeiros. Divulgação voluntária. Características corporativas.

## 1 INTRODUCTION

Organizations must reflect on their business structure, assessing risks and opportunities, including their ability to generate value for themselves and their stakeholders from the resources they have, whether financial (e.g. financial capital and manufactured capital) or non-financial (e.g. human, natural, intellectual, social and relationship capital). All these resources are allocated to the firm to generate value (Paredes, Besen & Almeida, 2022). As a result, there has been an increase in demand for corporate reports that can comprehensively show corporate resources and their interaction, i.e. the disclosure of financial and non-financial information. An example of a corporate report in this sense is Integrated Reporting (IR).

In 2010, a global coalition of regulators, investors, companies, standard setters, accounting professionals and non-governmental organizations started the International Integrated Reporting Council (IIRC). In Brazil known as "*Conselho Internacional para Relato Integrado*" After some discussions, IIRC issued the first conceptual framework for Integrated Reporting in 2013 (IIRC, 2013a). In 2010, South Africa was the first country to make the implementation of integrated reporting mandatory for public companies listed on the Johannesburg Stock Exchange (Baboukardos & Rimmel, 2016; Barth, Cahan, Chen & Venter, 2017; Hossain, Bose & Shamsuddin, 2023).

One aspect that has contributed to the importance that IR has gained in the corporate world refers to the merger between the IIRC and the Sustainability

Accounting Standard Board (SASB), aiming to create the Value Reporting Foundation (VRF), which took place in December 2020. The SASB offers a set of comprehensive and robust planning and reporting tools to help companies and investors develop a shared understanding of how company value is created, preserved or eroded over time (VRF, 2022). VRF creation represented the beginning of the process of the standardization of sustainability reports.

In August 2022, the consolidation of the VRF into the IFRS Foundation was announced, following the commitment made at COP26 to consolidate the staff and resources of the main global sustainability disclosure initiatives to support the work of the International Sustainability Standards Board (ISSB) in developing a global baseline of sustainability disclosures for the capital markets. The International Accounting Standards Board (IASB) and the ISSB work to align the Integrated Reporting Framework in their standard-setting projects and requirements and actively encouraging its continued adoption to drive high-quality corporate reporting (Brazilian Integrated Reporting Monitoring Committee "*Comissão Brasileira de Acompanhamento do Relato Integrado*" [CBARI], 2022).

In Brazil, IR has been gaining ground since the publication of its conceptual framework. According to the IIRC (2013b), the pilot program included twelve companies listed on B3, from different sectors, and in 2020, according to CBARI, the number of adopting companies was already thirty. In addition, with the advent of the Law 13.303/2016, there is now a specific provision requiring Brazilian public companies and mixed-capital companies to publish an integrated or sustainability report every year. In 2020, Technical Guideline CPC 9 (OCPC 9) Integrated Reporting was approved, based on the IIRC framework, to guide Brazilian companies on the preparation and disclosure of Integrated Reporting. In the same year, OCPC 9 was approved by the Brazilian Securities and Exchange Commission ("*Comissão de Valores Mobiliários*" - CVM), through CVM Resolution No. 14, and by the Federal Accounting Council ("*Conselho Federal de Contabilidade*" - CFC), through General Technical Communication ("*Comunicado Técnico Geral* " - CTG) 9. This implies that, in Brazil, as of 2021, companies that disclose IR must prepare it in accordance with OCPC 9 (framework).

Finally, in June 2022, the Federal Accounting Council (CFC) approved Resolution 1670, which created the Brazilian Sustainability Pronouncements Committee ("*Comitê Brasileiro de Pronunciamentos de Sustentabilidade*" - CBPS) to allow Brazilian regulatory bodies to issue sustainability financial reporting standards, considering the adoption of the international standards issued by the ISSB (CFC, 2022).

In the Academy, national and international research has been dedicated to finding explanations for the disclosure of information, both mandatory and voluntary. Some corporate characteristics, such as size, indebtedness, profitability, stock exchange listing segment, sector of activity, among others, are considered determinants of the level of voluntary disclosure (Fernandes, 2013; Dal Magro, Manfroi, Cunha, & Nogueira, 2015; Ricardo; Barcellos & Bortolon, 2017) and environmental disclosure (Guidry & Patten 2012; Rover, Tomazzia, Murcia & Borba 2012). Also noteworthy are the studies that incorporated performance into the relationship with information disclosure (Borges, 2019; Buallay, 2019; Gonçalves, Anjos & Freitas 2019; Jost, Kroenke & Hein, 2021).

Specifically in regards to IR disclosure, research focuses on different topics, such as the relevance of information (Baboukardos & Rimmel, 2016); mandatory adoption and company value (Barth et al., 2017); reducing the cost of capital (García-Sánchez; Noguera-Gámez 2017); increasing profitability (Mervelskemper & Streit, 2017); the level of adherence to the IIRC framework (Kiliç & Kuzey, 2018); institutional isomorphism and the search for legitimacy (Reis & Morais, 2021) among others. As for the non-financial capitals covered by IR, Nascimento, Rodrigues, Araújo and Prazeres (2015), Mantovani, Jael, Lee, Bezerra and Santos (2017) and Teixeira, Rech, Zanolla and Couto (2021) looked into assessing their respective levels of disclosure, but without considering the possible determinants of the disclosure of each of the non-financial capitals in IR, thus suggesting a gap in the literature regarding the possible corporate characteristics that determine this type of voluntary disclosure.

In light of the above, it is possible to realize the importance that IR has acquired both nationally and internationally, since the IFRS Foundation encourages the adoption of the Integrated Reporting Framework as a mechanism that helps to provide a concise and comprehensive understanding of how a business creates value over time (Value Reporting Foundation, 2022). There is also a lack of studies evaluating the disclosure of key IR indicators in the national context, especially those relating to non-financial capital, as well as the limited existing conclusions about the factors that may be related to the voluntary disclosure of non-financial information. All these elements lead to the proposal of the following research problem: what is the relationship between corporate characteristics and the voluntary disclosure of non-financial capital in integrated reports published by Brazilian listed companies?

The aim of this research is to examine the relationship between corporate characteristics and the voluntary disclosure of non-financial capital in integrated reports published by Brazilian public companies, from the perspective of the disclosure theory. In order to achieve this goal, 26 companies listed on B3 that adopted IR were analyzed, according to IIRC standards, and that had a continuous frequency in their publication in the period from 2016 to 2020, that is, after the pilot project. Data was collected for the characteristics of the firms and disclosure indices were established for each of the non-financial capitals of the IR. The data collected was then analyzed using descriptive statistics and linear regression models.

The purpose of IR is to stimulate dialogue between corporate financial and non-financial information reports, characterizing an innovation in the business world, through simple language about the financial and non-financial capital flows that result in the creation of value by the company over time (IIRC, 2013a). In this way, IR is a process of harmonization and convergence of organizational management systems and the corporate communication process. The conceptual basis of IR consists of a profound change in the mindset and attitude of the entire organization, incorporating sustainable wealth values in a strategic way (Carvalho & Kassai, 2014).

Therefore, this research is relevant because of its potential to contribute to discussions on the proposed international standardization of voluntary disclosure, in the search for improvements in corporate disclosure. Nevertheless, the findings

of this study can contribute to the needs not only of investors, but also of other interested parties in understanding the corporate characteristics that affect the disclosure of non-financial capital in IR. Finally, in the academic sphere, the aim is to contribute to the literature by providing empirical evidence of how elements related to performance, capital structure, corporate governance, firm size and sector impact on the level of disclosure of non-financial capital in the IRs published by Brazilian listed companies.

## 2 HYPOTHESES DEVELOPMENT

Disclosure theory assumes that information is widely available to users, increasing the level of corporate transparency and reducing the asymmetry of information common to the business environment (Fernandes, 2013). According to Guidry and Patten (2012), the theory is rooted in financial research, so its foundations can be attributed to two primary studies: Verrecchia (1983), Dye (1985).

Verrecchia (1983) and Dye (1985) explored the choice of voluntarily disclosing or withholding information. In short, Verrecchia (1983) shows that, due to the existence of ownership costs associated with information disclosure, investors do not interpret omission as a bad thing. On the other hand, Dye (1985) suggests that, in the case of non-disclosure, investors may be unsure about the nature of the information that the manager is withholding.

In the context of IR, there are studies that have assessed the level or compliance of companies' disclosure in relation to their framework. However, these studies have not investigated which factors or characteristics may be determining these disclosures, which is what this research aims to do. In this perspective, Nascimento et al. (2015) verified the levels of adherence of Brazilian new market companies to the key performance indicators of non-financial capitals set out in the IR and found unsatisfactory adherence to the IR disclosure model, except for natural capital.

In addition, Mantovani et al. (2017) verified how the capitals proposed by the IR framework are disclosed and concluded that the form of capital disclosure was fully or partially complied with, except for manufactured capital, which was not disclosed in accordance with the model. In turn, Teixeira et al. (2021), when assessing the level of disclosure of non-financial information in IR, observed that the disclosure index of non-financial information, considering all four capitals, was classified as unsatisfactory.

From another point of view, outside the context of IR, other studies have examined the determinants of disclosure, indicating possible variables related to the level of voluntary disclosure by companies. Corroborating the idea that larger companies are more likely to disclose information since, in theory, they face higher agency costs and greater problems of information asymmetry, the studies by Verrecchia (2001), Murcia and Santos (2009), Cruz and Lima (2010), Naime and Bauer (2012), Rover et al, (2012), Fernandes (2013), Frias-Aceituno, Rodríguez-Ariza and Garcia-Sánchez (2014), Dal Magro et al. (2015), Ricardo, Barcellos and Bortolon (2017), Borges (2019) and Pinheiro, Lameu, Sampaio and Santos (2022)

support the hypothesis that the voluntary disclosure index is associated with company size.

Considering this, it is understood that the relationship between firm size and level of disclosure extends to IR. The central argument is that larger companies, in addition to being more politically visible, tend to attract more attention from investors and the government, which is why they are expected to have a high standard of disclosure of non-financial information (Moura, Zanchi, Mazzioni, Macêdo & Krueger, 2017). This leads to the first hypothesis of this study:

**$H_1$**: the size of the firm has a positive relationship with at least one index of disclosure of non-financial capital in the IR of Brazilian listed companies.

There is no consensus on the effect of indebtedness on the level of voluntary disclosure. Fernandes (2013), when verifying the factors that influenced the environmental disclosure of Brazilian companies listed on B3 between 2006 and 2010, observed that indebtedness had a negative impact. On the other hand, Rover et al. (2012) points out that companies with a higher level of indebtedness tend to disclose more information voluntarily, to satisfy creditors and remove suspicions about the transfer of wealth to shareholders, reducing agency costs. From this perspective, we have the second hypothesis of the study:

**$H_2$**: indebtedness has a significant relationship with at least one index of disclosure of non-financial capital in the IR of Brazilian listed companies.

According to Dal Magro et al. (2015), profitability can also contribute to explaining the level of disclosure. Frias-Aceituno, Rodríguez-Ariza and Garcia-Sánchez (2014) point out that the company's profitability has a positive impact on the likelihood of the type of report that will be produced. Souza and Almeida (2017), when evaluating the factors related to the level of disclosure of Brazilian publicly traded companies, showed that limited profitability motivates companies to increase the disclosure of information as a compensatory method. Thus, the third hypothesis of the study was developed:

**$H_3$**: profitability has a significant relationship with at least one index of disclosure of non-financial capital in the IR of Brazilian listed companies.

Disclosure is a pillar of corporate governance, which plays the role of creating a link in the company's communication with stakeholders (Dal Magro et al., 2015). In this sense, Murcia and Santos (2009) showed that larger companies in the electricity sector with better corporate governance practices have higher levels of voluntary disclosure. In turn, Fernandes (2013), when assessing the relationship between the level of disclosure and corporate governance, using the B3 listing segment as a metric, showed that only the size of the company positively influences the level of environmental disclosure. Based on the assumption that the listing segment suggests alignment with best corporate governance practices, the fourth hypothesis of the study is presented:

**$H_4$**: the listing segment has a significant relationship with at least one index of disclosure of non-financial capital in the IR of Brazilian listed companies.

Finally, sector regulation is a significant factor in explaining the level of voluntary disclosure by publicly traded companies. Murcia and Santos (2009) found that the electricity sector is the one in which companies have the highest

level of voluntary disclosure. Naime and Bauer (2012) observed that the importance of social and environmental disclosure by organizations is directly related to the sector of the economy, among other factors. In turn, Borges (2019) explains that the reasons that lead organizations to disclose voluntary environmental information in their annual reports are associated with the sector in which they operate. This brings us to the fifth and final hypothesis of the study:

**$H_5$**: the sector of activity has a significant relationship with at least one index of disclosure of non-financial capital in the IR of Brazilian listed companies.

## 3 METHODOLOGICAL PROCEDURES

Initially, to define the sample, all Brazilian publicly traded companies that published non-financial corporate reports with the nomenclature integrated reporting or that at least mentioned using the IIRC methodology in their publications in the 2019 base year were selected. This specification resulted in a list of 83 companies. From this list, we searched the websites of all the 83 companies, in the investor relations or sustainability information field, for reports for the years 2016, 2017, 2018, 2019 and 2020, the period after the IR pilot project in Brazil and up to the last year with publicly available data at the time of data collection.

However, simply mentioning the integrated reporting nomenclature does not necessarily mean that the IIRC framework has been adopted. For this reason, the second stage sought to identify whether the companies explicitly stated that they had used the IIRC framework or the IIRC methodology without interruption. Also in this phase, to avoid duplication, companies belonging to the same economic group were excluded, and only 14 (fourteen) companies fit the profile researched to make up the sample, i.e. the publication of IR in the IIRC methodology in the years 2016 to 2020.

Given the low number of companies that published IR in the IIRC methodology, there was a need to expand the sample in order to enable the analysis procedures foreseen in the research. The solution found was to also consider the non-financial corporate reports of the companies enrolled in the selection process for participation in the 17th theoretical portfolio of the B3 Corporate Sustainability Index ("*Índice de Sustentabilidade Empresarial*" - ISE). The idea here is that, as the ISE selects companies recognized as being committed to the dimensions of sustainability, the non-financial reports of these companies would, in a way, be in line with the IIRC framework.

From this additional set of companies, after excluding companies from the same economic group, as well as those already selected in the first stage, twelve (12) companies from the ISE's theoretical portfolio were included. As a result, the final sample consisted of 26 companies that disclosed integrated reports according to the IIRC methodology or related non-financial reports, without interruption, between 2016 and 2020. Among the companies in the sample, 19 had their reports subjected to limited assurance in at least one year during the period analyzed. In detail, of the 130 reports analyzed, 56 did not receive limited assurance.

Once the sample had been selected, the research variables were defined. First of all, it should be noted that the term integrated reporting used here is independent of the nomenclature used by the companies to name their corporate reports. This is because the criteria for selecting the documents involved adopting the IIRC framework or a compatible methodology, as explained above.

Dependent variables were established for the level of disclosure of each of RI's non-financial capitals, namely: natural capital; social and relationship capital; human capital; and intellectual capital. The disclosure index for each non-financial capital was obtained from the key performance indicators (KPIs) proposed by the IIRC (2013a) and in the studies by Castro (2015) and Teixeira et al. (2021). The instrument used includes a total of 34 key indicators, seven for natural capital, eleven for human capital, eight for social and relationship capital and eight for intellectual capital. The key indicators can be found in Appendix A.

The dependent variables were calculated by adding up the frequency of the keywords for each of the indicators for each capital in the reports released by the companies, divided by the number of words attributed to the same non-financial capital in the instrument [see Appendix A]. For example, the sum of the frequency of natural capital keywords in AES Brazil's 2016 report was 124, so its natural capital disclosure index for the year was 3.54 (124 divided by 35, the number of keywords assigned to natural capital in the tool). This procedure was based on discussions by Henry and Leone (2016).

It is worth mentioning the limitations of using word lists to estimate the disclosure of non-financial information in corporate reports. One of the main weaknesses of the method is that the disclosure of a certain term or expression does not necessarily mean that the underlying theme has been properly explored in the document. Furthermore, as explained in Appendix A, given that there is a specific set of keywords for each non-financial capital, there is a possibility that some topics will be concentrated to the detriment of others in the frequency analysis. For example, it is appropriate to assume that companies in the electricity sector disclose the word 'energy' in their reports, a term used to measure environmental capital, more frequently than companies in other sectors. Therefore, the interpretation of the results documented in this research should be made considering the limitations in this regard.

On the other hand, despite the argument that using the frequency of keywords to measure the disclosure of non-financial capital could lead to distortions, such as high rates due to language vices because of possible repetition of words in the documents, this is unlikely. This is because the instrument is made up of several specific keywords, which aim to map the disclosure of the subject as a whole, usually not subject to repetition due to writing problems.

According to Loughran and Mcdonald (2016), the use of word lists to measure elements of disclosure in corporate reports has been widely used in accounting and finance. In related studies developed with samples that include Brazilian companies, this procedure has also been used (Malaquias & Borges, 2021; Borges & Malaquias, 2022). In addition, there are benefits associated with the use of word lists in disclosure research, namely: i) reduced subjectivity in evaluating reports; ii) studies with large samples and dense documents; and iii) easy replication from the instrument used (Loughran & Mcdonald, 2016).

In other words, the disclosure index of company *i* in year *j* corresponds to the ratio between the frequency of keywords of the corresponding non-financial capital identified in the corporate report and the number of keywords in the instrument for this type of capital. Thus, the disclosure index involves a relative measure of the number of times each non-financial capital keyword appeared in the report. The use of a relative measure is due to the different number of keywords between the non-financial capitals in the instrument.

Regarding the independent variables of interest, which were measures of corporate characteristics, the following were established: i) firm size, measured by the natural logarithm of total assets at the end of each year; ii) indebtedness, obtained by the ratio of gross debt (loans, financing and debentures, short and long term) to total assets at the end of each year; iii) return on equity (ROE), found by the ratio between net profit and equity; iv) listing segment, defined by a vector of dummies identifying the special listing segments of B3; v) sector, defined by a vector of dummies identifying the sectors in which the firms operate. Yearly control was also included. The data used to estimate the independent variables was obtained from Economatica®. Table 1 shows a summary of the independent variables.

**Table 1**
Independent variables of interest

| Acronym | Name | Measurement | Authors |
|---|---|---|---|
| lnatv | Size | Natural logarithm of total assets at the end of each year. | Verrecchia (2001), Murcia and Santos (2009), Cruz and Lima (2010), Frias-Aceituno, Rodríguez-Ariza, Garcia-Sánchez (2014), Ricardo, Barcellos and Bortolon (2017), Borges (2019), Pinheiro et al. (2022). |
| end | Indebtedness | Ratio of gross debt (short- and long-term financing and debentures) to total assets at the end of each year. | Salotti and Yamamoto (2008), Murcia and Santos (2009), Rover et al. (2012). |
| roe | Return on equity | Ratio of net profit to shareholders' equity. | Rover et al. (2012), Albuquerque, Rodrigues, Miranda e Sampaio (2017). |
| sl | Listing segment | Vector of dummies that identifies the special listing segments: traditional, level 1, level 2, new market. | Murcia and Santos (2009), Fernandes (2013), Dal Magro et al. (2015). |
| setor | Sector of activity | Vector with 8 (eight) dummies identifying the 9 (nine) sectors of activity, according to Economatica®. | Cooke (1992), Murcia and Santos (2009), Naime and Bauer (2012), Borges (2019). |

Source: Own elaboration.

The variables were analyzed using descriptive statistics and linear regression models estimated using the ordinary least squares method. Pooled data was

chosen due to the nature of the data analyzed, i.e. few companies (individuals) make up the sample each year. The generic econometric model is given by:

$$Non - finantial\ Capital_i = \alpha + \beta 1\ .Size_i + \beta 2\ .Indebtedness_i + \beta 3\ .Profitability_i + \sum_{s=1}^{4} \gamma_s\ .Listing\ Segment + \sum_{j=1}^{8} \theta_j\ .Sector_j + \sum_{t=2016}^{2020} \delta_t\ .Year_t + \varepsilon_i \quad (1)$$

The models were estimated to have robust standard errors, so it deals with any problems arising from heteroscedasticity. For the tests, a statistical significance level of up to 10% was considered. The variance inflation factor (VIF) was used to examine the existence of multicollinearity.

## 4 RESULTS

To identify the published reports, the nomenclatures used were first checked. Table 2 shows the results found for each company in the sample.

**Table 2**
Nomenclatures used by companies to designate non-financial reports

| Nr. | Companies | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|---|
| 01 | AES Tiete Energia SA | SR | SR | SR | SR | SR |
| 02 | BCO Bradesco S.A. | IRE | IRE | IRE | IRE | IRE |
| 03 | BCO Brasil S.A. | AR | AR | AR | AR | AR |
| 04 | BCO Santander (Brasil) S.A. | AR | AR | SIB | SIB | SIB* |
| 05 | BNDES Participações S.A. - BNDESPAR | AR | IRA | IRA | IRA | AR |
| 06 | BRB Bco de Brasília S.A. | IR | IR | IR | IR | IR |
| 07 | BRF S.A. | ASR | ASR | ASR | IRE | IRE |
| 08 | CCR S.A. | ASR | ASR | ASR | ASR | AR |
| 09 | Centrais Elétrica de Santa Catarina S.A. | SR | R | R | R | R |
| 10 | CIA Energética de Minas Gerais - CEMIG | ASR | ASR | ASR | ASR | ASR |
| 11 | CIA Paranaense de Energia - COPEL | SR | ASR | IRE | IRE | IRE |
| 12 | CIA Saneamento do Paraná - SANEPAR | MSR | MSR | SR | SR | SR |
| 13 | CIA Siderúrgica Nacional - CSN | IR | IR | IR | IR | IR |
| 14 | CPFL Energia S.A. | AR | AR | AR | AR | AR |
| 15 | CSU Cardsystem S.A. | AR | AR | AR | AR | AR |
| 16 | Ecorodovias Infraestrutura e Logística S.A. | SR | SR | SR | SR | IRE |
| 17 | Eletropaulo Metrop. Elétrica São Paulo S.A. | ASR | ASR | ASR | ASR | ASR |
| 18 | Gerdau S.A. | IR | IR | IR | IR | AR |
| 19 | Itaú Unibanco Holding S.A. | IR | IR | SR | IRA | IRA |
| 20 | JSL S.A. | AR | AR | AR | AR | IRA |
| 21 | Light S.A. | ASR | AR | AR | AR | IASR |
| 22 | Lojas Renner S.A. | AR | AR | AR | AR | AR |
| 23 | M. Dias Branco S.A. Ind. Com. de Alimentos | AR | IRA | IRA | IRA | IRA |
| 24 | Telefônica Brasil S.A. | SR | SR | SR | SR | SR |
| 25 | Totvs S.A. | IR | IR | COPGP | IR | IR |
| 26 | Ultrapar Participações S.A. | AR | AR | AR | IRE | IRE |

Note: SR = Sustainability Report; IR = Integrated Report; AR = Annual Report; IAR = Integrated Annual Report; ASR = Annual Sustainability Report; SIB = Sustainability Indicators Booklet; IRE = Integrated Report; R = Report; MSR = Management and Sustainability Report; IASR = Integrated Annual Sustainability Report; COPGP = COP Global Pact.* the report of BCO Santander (Brasil)

S.A. in 2020 was released in scanned format (image), preventing the counting of keywords to measure non-financial capital.
Source: Own elaboration.

Table 2 shows that the companies use different names to designate their non-financial reports, and that many of them do not keep the names used standardized over the years. Of the 26 companies analyzed, only 11 (42%) used the same name for their reports during the period analyzed. The other companies, approximately 58%, varied in terms of the terminology used. The term Integrated Reporting was observed in the reports of only two companies consecutively over the five years. This shows a lack of standardization in the name of the non-financial reports published by Brazilian publicly traded companies. The explanation for this finding may lie in the voluntary nature of this type of publication.

After examining the content and form of disclosure of non-financial information by companies that participated in the integrated reporting pilot program in Brazil, Alves, Kassai, Lucas and Ferreira (2017) also observed different names for the document, which involved nomenclatures such as sustainability report, annual report, annual and sustainability report and integrated report. The use of different names by companies to designate the same type of corporate report is a potential problem. This is because, in addition to generating confusion about the scope of the information set out in the document (for example: a report entitled 'sustainability report' suggests the disclosure of information focused exclusively on sustainable aspects, a narrower scope than that provided for in the definition of integrated reporting), it makes it difficult to identify whether or not the IR framework has been adopted.

In this research, based on the findings documented in Table 2, it is not possible to identify, from the nomenclature alone, whether the reports were prepared in accordance with the RI framework, but it is necessary to observe whether the company states that it uses this methodology, as well as the content disclosed in the report. This statement about the methodology was consulted in the reports themselves, as well as in item 7.8 (social and environmental policies) of the Reference Form (FRE) filed with the CVM .

Table 3 shows the descriptive statistics for the quantitative variables dependent and independent of interest. The reduced number of observations for the variables concerning non-financial capital (129) was due to the fact that BCO Santander (Brazil) S.A.'s 2020 report was released in scanned format (image), preventing the keywords for measuring non-financial capital from being counted, as noted in Table 2.

**Table 3**
Descriptive statistics for quantitative variables

| Variables | Obs. | Average | S. D. | C.V. | Min. | Max. |
|---|---|---|---|---|---|---|
| natu | 129 | 6.6339 | 4.1816 | 63.0338 | 0.6571 | 22.1429 |
| soci | 129 | 13.3170 | 6.9162 | 51.9351 | 2.7586 | 35.1724 |
| huma | 129 | 3.6558 | 2.2216 | 60.7692 | 0.5556 | 12.2222 |
| itlc | 129 | 9.7370 | 4.9485 | 50.8216 | 2.5556 | 23.8889 |
| lnatv | 130 | 17.3570 | 1.9221 | 11.0739 | 12.7784 | 21.4712 |
| end | 130 | 68.1848 | 22.8105 | 33.4539 | 7.9517 | 99.4936 |
| roe | 130 | 10.7279 | 23.0996 | 215.3227 | -165.7718 | 62.0459 |
| soci | 129 | 13.3170 | 6.9162 | 51.9351 | 2.7586 | 35.1724 |

Notes: Obs. = observations; S. D. = standard deviation; C. V. = coefficient of variation; Min = minimum; Max = maximum; natu = natural capital disclosure index; soci = social and relationship capital disclosure index; huma = human capital disclosure index; itlc = intellectual capital disclosure index; lnatv = company size; end: indebtedness; roe = return on equity. For more information see Table 1.
Source: Own elaboration.

Table 3 shows that human capital had the lowest average for the disclosure index (3.65), followed by natural capital (6.63), intellectual capital (9.73) and, finally, social and relationship capital (13.31). These findings differ from those of Borges and Malaquias (2022), who used a similar methodology to measure corporate social responsibility (CSR) disclosure in CSR reports and management reports published by Brazilian listed companies. On this occasion, Borges and Malaquias (2022) found averages of 2.35 for environmental disclosure, 1.65 for social disclosure and 2.90 for the economic dimension. The explanations for the differences may lie in the different types of reports between the samples, as well as in the specific segregation into natural, social, human and intellectual capital provided for in the IR framework and, hence, used in this study.

It should be remembered that the disclosure index is a relative measure of the number of occurrences of the keywords that identify the different capitals in the companies' corporate reports. As for the independent variables of interest, the average debt ratio of the companies in the sample was approximately 68.19%, while profitability had an average of 10.72%. As far as the firm size is concerned, the average natural logarithm of total assets was 1.92. The variables for listing segment, sector and year are not shown in Table 3 because they are dummies.

Table 4 shows the results for the effect of corporate characteristics on IR's non-financial capital disclosure index.

**Table 4**
Effect of firm characteristics on the disclosure of non-financial capital in IR

| variables | natu | soci | huma | itlc |
|---|---|---|---|---|
| lnatv | 1.1098*** | 2.4297*** | 0.7110*** | 1.7564*** |
| end | -0.0197* | -0.0791*** | -0.0065 | -0.0777*** |
| roe | -0.0024 | -0.0030 | -0.0002 | -0.0024 |
| sl | -0.1302 | 0.4797 | 0.0828 | -0.4123 |
| **sector** | | | | |
| Communications | -2.4464* | -7.4188*** | -1.4810* | -7.9771*** |
| Cyclical consumption | 1.8453*** | 2.6808 | 0.6094 | 3.1543*** |
| Non-cyclical consumption | 1.4990** | 1.1339 | 1.1770*** | 2.6363*** |
| Finance | -2.6281*** | -2.2087 | -0.8278 | -1.4992 |
| Basic Materials | -1.0759 | -0.0814 | 0.3044 | -3.3643* |
| Oil and Gas | -0.8637 | -6.2373*** | -1.0426* | -0.8523 |
| Information Technology | -0.8821 | -0.2203 | 1.4342** | 3.7819* |
| Public utility | 5.1682*** | 5.9036*** | 1.6313*** | 2.9773*** |
| **Constant** | -12.1179*** | -25.9233*** | -9.2647*** | -15.1324*** |
| **Year** | Yes | Yes | Yes | Yes |
| **R2** | 0.5779 | 0.4824 | 0.3822 | 0.4789 |
| **Average VIF** | 1.18 | 1.18 | 1.18 | 1.18 |
| **Obs.** | 129 | 129 | 129 | 129 |

Notes: significant at *10%; **5% and ***1%. For information on the independent variables, see Table 1. The variable sector had "Industrial goods" as a reference and was therefore omitted in the estimation.
Source: Own elaboration.

Based on the results presented in Table 4, it can be seen that there is a positive and statistically significant relationship at the 1% level between the size of the firm and the variables for the disclosure indices of non-financial IR capital. This suggests that the larger the company, the greater the level of disclosure of the non-financial capital that makes up IR. This result corroborates hypothesis $H_1$, which conjectures that the size of the firm and the disclosure index are positively related.

This finding is consistent with previous literature, reinforcing the argument that large companies are more likely to disclose voluntary information because they face higher agency costs and greater problems of informational asymmetry (Verrecchia, 2001). The results are also in line with previous studies that have shown a positive effect of size on discretionary disclosure, such as Murcia and Santos (2009), Cruz and Lima (2010), Naime and Bauer (2012), Rover et al, (2012), Fernandes (2013), Frias-Aceituno, Rodríguez-Ariza and Garcia-Sánchez (2014), Dal Magro et al. (2015); Ricardo, Barcellos and Bortolon (2017), Borges (2019) and Pinheiro et al. (2022).

Regarding indebtedness, the results were statistically significant at the 10% level for the disclosure of non-financial natural, social, relationship and intellectual capital, suggesting that indebted companies tend to have lower disclosure rates on these IR topics. As indebtedness was not significant in explaining variations only in the level of disclosure of human capital, hypothesis $H_2$ is supported. It is worth mentioning that Fernandes (2013) had already shown negative impacts on non-financial disclosure resulting from firms' indebtedness.

Despite the argument that more indebted companies disclose more information in order to signal transparency and meet the needs of creditors, as

conjectured by Rover et al. (2012), the literature also considers the opposite, as shown in Table 4. Fernandes (2013) found a negative relationship between indebtedness and the disclosure of environmental information by Brazilian publicly traded companies. One possible explanation for this effect lies in the financial restrictions that indebted companies are subject to. High indebtedness alone is an element that makes it difficult for the firm to obtain credit, which is why any higher expenditure on publishing additional voluntary information may be considered unnecessary.

As for the characteristics relating to profitability, measured by return on equity, and corporate governance, verified by the special listing segment, the findings were not statistically significant for any of the four models estimated. As a result, no inferences can be made about hypotheses $H_3$ and $H_4$, in the sense that profitability or corporate governance could have some relevant effect on the disclosure of non-financial capital by IR. The results contradict findings in the literature that indicate profitability and corporate governance as determinants of non-financial disclosure, such as Frias-Aceituno, Rodríguez-Ariza and Garcia-Sánchez (2014) and Murcia and Santos (2009), respectively.

Finally, about the analysis of hypothesis $H_5$, that the sector is a determining characteristic of the disclosure of non-financial capital in IR, the results found confirm it. This is because, in all the models, one of the dummies identifying the sectors analyzed was significant in explaining variations in the disclosure indices. It is worth mentioning that, depending on the sector observed, the effect on disclosure can be positive or negative. Metrics that identify the sectors in which companies operate have been shown to be associated with voluntary disclosure of non-financial information in previous studies, such as Murcia and Santos (2009) and Borges (2019).

One example which illustrates the effect that the sector has on the disclosure of non-financial information is the regulatory differences. In Brazil, the National Electric Energy Agency ("*Agência Nacional de Energia Elétrica*" - ANEEL), the regulatory agency responsible for regulating and supervising the electricity sector, requires companies in this sector to publish a sustainability report, with information compatible with the Global Reporting Initiative (GRI) model. Conditions like this may explain why companies in certain sectors disclose more non-financial information.

A summary of the findings documented in this research is shown in Table 5.

**Table 5**
Summary of the hypotheses examined in the research

| Hypothesis | Observed signal | Hypothesis testing |
|---|---|---|
| H1 | + | Confirmed |
| H2 | - | Confirmed |
| H3 | Ø | Not significant |
| H4 | Ø | Not significant |
| H5 | +/- | Confirmed |

Notes: $^{+}$ significant positive relationship; $^{-}$ significant negative relationship; Ø non-significant relationship.
Source: Own elaboration.

As shown in Table 5, the results showed a positive and statistically significant relationship between the size of the firm and the disclosure rates of non-financial capital in the IR, thus corroborating hypothesis $H_1$. In turn, there was a negative and statistically significant relationship for indebtedness in the models whose dependent variables were measures of natural, social and intellectual capital, which led to the confirmation of hypothesis $H_2$. The dummies identifying the companies' sectors maintained a positive or negative relationship, depending on the industry used as a reference, thus reinforcing hypothesis $H_5$. Finally, the profitability and listing segment variables were not significant, preventing inferences about their effects on the level of disclosure of non-financial capital in IR.

## 5 CONCLUSION

The study aimed to examine the relationship between corporate characteristics and the disclosure of non-financial capital, namely natural, social and relationship, human and intellectual capital, in the integrated reports of Brazilian listed companies. The results of this study allow us to conclude that three corporate characteristics are decisive in explaining variations in the disclosure of non-financial capital in IR, which are: size of the firm, sector of activity and indebtedness, except for human capital in this last variable.

It was found that the effect of the size on disclosure is positive, i.e. the larger the company, the higher the level of disclosure of non-financial capital that makes up IR. Possible explanations for this finding may be linked to the expectation of companies to reduce information asymmetry, which can generate additional costs, as well as the increasing demand from stakeholders, other than just investors and creditors, for information on the sustainability aspects of the business and its ability to generate value from non-financial resources. In other words, these could be large companies seeking to legitimize themselves in society.

On the other hand, in the case of indebtedness, the sign found was negative, indicating that more indebted companies do not seem to be concerned with this type of voluntary disclosure. This may imply that companies continue to access expensive capital even without worrying about disclosing non-financial information, including information on aspects of human capital (number and diversity of employees, age group, remuneration, staff training, etc.). On the other hand, this may reflect that, for the sample surveyed, creditors take the risk of not knowing non-financial information that could have future financial impacts on the business.

As far as the sector is concerned, the sign of the relationship with disclosure depends on the type of sector considered. Some sectors are associated with greater disclosure of non-financial capital, while in others the relationship is inverse. For example, the utilities sector showed a statistically significant positive relationship with the disclosure of all non-financial capital, which is consistent with the results of Murcia and Santos (2009), who found that companies in the electricity sector (utilities) maintain greater disclosure. In contrast, the basic materials sector showed a statistically significant negative relationship with intellectual capital disclosure, suggesting that this capital is poorly disclosed by this sector. This can be

explained by the mimicry that exists in the sectors, i.e. companies in the same sector present similar disclosures so as not to increase political costs, especially those belonging to regulated sectors.

At last, no evidence was found that profitability or listing segment are determining characteristics of the disclosure of non-financial capital in IR for the sample investigated. This result may indicate that, although there is a demand for non-financial information in the market, related to environmental, social and governance aspects, the relationship between this information and that arising from the financial aspects of the business is not yet perceived in such a way as to reflect on the return on equity invested, nor does it translate into the possibility of remaining in a certain listing segment. About the last variable mentioned, the disclosure of non-financial capital may be more linked to the fact that it is part of a specific B3 index, such as the ISE, since a large part of the sample is part of this portfolio.

In general, based on the results achieved, it was possible to infer that the process of preparing the IR by the companies listed on B3, since it is voluntary, is slowly progressing and the companies are not consistent in their disclosure. During the period analyzed, it was possible to see that the companies do not maintain a standard in the nomenclature of the reports disclosed, causing a lack of comparability, once, even using the term integrated, the reports did not present the essential elements of Integrated Reporting.

Another relevant observation was the evolution of the IR preparation process during the period under study. For instance, in 2016, many reports did not really present the elements and IR principles, but rather a report without connectivity of information, more focused on disclosing the financial results achieved by the organization. In 2020, we saw reports that were better prepared and more consistent with the IR framework, reflecting the fact that the change in culture is slow but progressive within an organization, in the direction of integrated thinking.

It was also found in the reference form that some companies, despite naming their IR report, did not follow the IIRC methodology. Another detail is that the information on companies contained in the reference form on the website of the Securities and Exchange Commission ("*Comissão de Valores Mobiliários*" CVM) does not always relate to the year indicated. In some cases, information from previous years is uploaded, which makes data collection difficult and leads to a lack of comparability.

It is expected that this study will contribute to the literature, strengthening discussions on the proposal for international standardization of voluntary disclosure, to improve company disclosure and meet the needs of investors and other interested parties. In addition, this research advances by identifying the corporate characteristics that influence the disclosure of non-financial capital by Brazilian listed companies, especially those that have published their IR.

Limitations include the procedure used to measure the disclosure of non-financial capital, which basically involved the relative counting of key words in the report, using the instrument shown in Appendix A. As this is an automated textual analysis, there is a possibility that some words may have been used outside the

context of the respective capital, thus interfering with the results. It is also important to note that, with OCPC 09 in force from 2021, companies that prepare their IR must follow the IIRC framework. In this sense, the approval of OCPC 09 by the regulatory bodies (CVM and CFC) may influence the analysis of IR disclosure in studies after the period investigated here (2016 to 2020) and lead to different results due to the new standard, offering an opportunity for future research.

Still along the lines of future research, we suggest evaluating the IR disclosure index in a larger sample of companies, even if they are foreign. Likewise, it would be interesting to deepen the analysis by sector, given that not all non-financial capital indicators are relevant to each industry. Another point would be to check the comparability of the IR of companies in the same sector.

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**Appendix A**

Key indicators for the types of capital and respective keywords for measuring disclosure

| CAPITALS | DISCLOSURE |
|---|---|
| **Natural Capital** | **35 keywords** |
| 1 - CO2 emissions | 1. emission, emissions, gas, gases, carbon, CO2; |
| 2 - energy consumption by energy source | 2. energy, source |
| 3 - quantity of waste | 3. waste, waste |
| 4- environmental accidents | 4. accident, fine, compensation, damages, lawsuit, spill, explosion, fire, leak, rupture, disaster, chemicals. |
| 5 - recycled waste | 5. recycle, recycled, recycling, recyclable |
| 6 - investments in environmental protection | 6. investment, protection, protections, environmental, environmental, environment |
| 7 - animals acquired for testing | 7. animals, animal, test |
| **Social and Relationship Capital** | **29 keywords** |
| 1 - "excellent place to work" ranking | 1. ranking, excellent, best, place, excellence |
| 2 - number of volunteers | 2. voluntary |
| 3 - labor claims/lawsuits | 3. claims, labor, complaint, process; |
| 4 - involvement in social actions | 4. actions, social, action, social, project |
| 5 - involvement in cultural projects | 5. project, culture, cultural, cultural; |
| 6 - customer satisfaction index | 6. satisfaction, survey, index |
| 7 - provision for social projects | 7. project, social, social |
| 8 - social investment/philanthropy | 8. investment, social, philanthropy, spending |
| **Human Capital** | **45 keywords** |
| 1 - number of employees | 1. official, employee, collaborator |
| 2 - diversity | 2. diversity, sex, gender, age, ethnicity, religion, origin, race |
| 3 - total invested in training | 3. training, qualification |
| 4 - employees in corporate e-learning | 4. e-learning, corporate, virtual, ODL, online, learning |
| 5 - average age | 5. age, age; |
| 6 - average number of training days per employee | 6. training, qualification |
| 7 - results of the employee survey | 7. organizational climate survey |
| 8 - accidents with injuries per million hours worked | 8. accident, injury |
| 9 - absenteeism rate | 9. absenteeism, frequency, severity, absence |
| 10 - dismissal fee | 10. dismissal, dismissal, dismissed, left, turnover, turnover |
| 11 - minimum wage ratio | 11. salary, remuneration |
| **Intellectual capital** | **27 keywords** |
| 1 - number of patents applied for | 1. patent |
| 2 - money spent on R&D | 2. R&D, research, development, spending |
| 3 - number of tests with new technology | 3. test, technology, new |
| 4 - brand recognition | 4. brand, recognition |
| 5 - number of new products developed | 5. product, new, developed |
| 6 - expenses with the development of the entity's changes/processes | 6. change, process, expense |
| 7 - software development costs for internal systems | 7. software, system, internal, expense |
| 8 - sales generated by R&D products | 8. sale, product, own, original, originals, research, development |

Source: Own elaboration.