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ASSOCIATION BETWEEN RISK DISCLOSURE AND (IN) EXISTENCE OF CORPORATE REPUTATION OF PUBLICLY TRADED COMPANIES IN BRAZIL

Associação entre o disclosure de riscos e a (in) existência de reputação corporativa em companhias abertas do Brasil

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ABSTRACT

Purpose - To analyze the possible association between non-financial risk disclosure and the (in) existence of reputation in the most prominent Brazilian publicly traded companies considering the legitimacy theory.
Design/methodology/approach - The sample assembles 118 corporations listed on B3 and 345 reference forms from 2006 to 2018. In the analysis of corporate reputation, the presence or absence on ISE and, or ICO2 from B3 was considered. For non-financial risk disclosure, a factor checklist containing 31 risks was taken, categorized under operational, damage, integrity, and strategic risks, from the analysis of Reference Forms. A tree regression, a multiple correspondence analysis, and a T-test of the difference between means were used for data analysis.
Findings - There is scientific evidence that the companies with reputations demonstrate non-financial risk disclosure superior to the others. This behavior is confirmed in the subcategories of integrity and strategic risks. Moreover, risk factors in the subcategory of integrity risks were crucial to non-financial risk disclosure.
Originality/value - This research paves the way to deepen the early debate surrounding risk disclosure and corporate reputation, especially regarding the quality of non-financial risk disclosure.

Keywords: Risk disclosure; Corporate reputation; Legitimacy theory.

RESUMO

Objetivo - Analisar a possível associação entre o *disclosure* de riscos não financeiros e a (in) existência de reputação nas maiores companhias abertas brasileiras, sob a ótica da teoria da legitimidade.
Desenho/metodologia/abordagem - A amostra reúne 118 empresas listadas na B3 e 345 Formulários de Referência de 2016 a 2018. Na análise da reputação corporativa, considerou-se a presença ou não das empresas no ISE e/ou no ICO2 da B3. Para o nível de *disclosure* de riscos não financeiros, considerou-se um *checklist* com 31 fatores de riscos, classificados nas subcategorias de riscos operacionais, de dano, de integridade e estratégicos, a partir da análise dos Formulários de Referência. Na análise dos dados, utilizou-se Árvore de Regressão, Análise de Correspondência Múltipla e Teste T de diferença entre médias.
Resultados - Há evidências científicas de que empresas com reputação apresentam *disclosure* de riscos não financeiros geral superior às demais, comportamento confirmado nas subcategorias de riscos de integridade e de riscos estratégicos. Ademais, os fatores de riscos da subcategoria de riscos de integridade foram determinantes do *disclosure* de riscos não financeiros.
Originalidade/valor - A pesquisa abre caminho para aprofundar o debate ainda incipiente sobre *disclosure* de riscos e reputação corporativa, especialmente considerando a qualidade do *disclosure* de riscos não financeiros.

Palavras-chave: *Discloure* de riscos; Reputação corporativa; Teoria da legitimidade.

1 INTRODUÇÃO

The high competitiveness of business has caused changes in the demands of investors and other stakeholders (Gunawan & Elsa, 2020). Ates (2020) indicates that a company's participation in a sustainability index, for example, is vital for investors in emerging markets, especially considering the environment of crises, financial scandals, increase in the business environment, markets, and initial public offering (Alves & Graça, 2013; Costa, Leal, & Ponte, 2017). Moreover, companies have used disclosure to present their relationship with the environment they operate and therefore achieve legitimacy (Beuren, Gubiani, & Soares, 2013).

In this scope, the mutual analysis of risk disclosure and corporate reputation is relevant because these constructs are fundamental to business strategies since good performance depends on both high returns and low risks (Bakhsh, Akhtar, & Akhtar, 2019). Thus, considering the possible association between corporate reputation and risk disclosure can make performance evaluation complete.

Because it is the disclosure of unfavorable aspects of the business (Moumen, Othman, & Hussainey, 2015; Polinsky & Shavell, 2012), many stakeholders consider corporate risk information negatively. Alves and Graça (2013) point out that risk disclosure helps gain the confidence of shareholders and the market. It occurs because the disclosure of information about risks enables users to improve their assessment of companies (Elzahar & Hussainey, 2012).

According to the legitimacy theory, it can be observed that the disclosure of clear, objective information, such as risk disclosure (Louhichi & Zreik, 2015) in annual reports is part of the companies' social contract and indicates their legitimacy (Watson, Shrives, & Marston, 2002). Consequently, to the investigation of the relationship between risk disclosure and corporate reputation, the latter is analyzed as a determining factor for the conduction of this disclosure type. We take into account that, grounded on the literature, there is evidence that companies with higher visibility have greater disclosure (Cardoso, De Luca, & Gallon, 2014; Cruz & Lima, 2010; Lopes, De Luca, Góis, & Vasconcelos, 2017), including on risks (Delgado-García, Quevedo-Puente, & Díez-Esteban, 2013). The above-mentioned assumption considers that companies with higher visibility are under more significant pressure for discretionary information, among them the organization's risk disclosure.

Due to little academic investigation regarding risk disclosure, the study focuses on the category of non-financial risks (Elshandidy, Shrives, Bamber, & Abraham, 2018; Leopizzi, Iazzi, Venturelli,

& Principale, 2020) and the tendency of companies to report them in a reduced way compared to financial risks (Amezaga-Alonso, Cilleruelo-Carasco, Zarrabeitia-Bilbao, & Ruiz-de-Arbulo-López, 2020). To this end, an analysis of evidenced disclosure quality was performed, especially exploring the subcategories of non-financial risks in accordance with the literature (Linsley & Shrives, 2006; Miihkinen, 2012; Ntim, Lindop, & Thomas, 2013).

From this perspective, this research differentiates itself by proposing an investigation that verifies the quality of non-financial risk disclosure in general and its subcategories, in this case, operational, damage, integrity, and strategic risks, and conjectures a relationship with corporate reputation. Moreover, according to Hassan (2009), there is a need to explore relationships in emerging country contexts, which is still occurring in an initial manner (Alves & Cherobim, 2009; Elamer, Ntim, & Abdou, 2020; Li, He, & Xiao, 2019; Neifar & Jarboui, 2018; Ntim, Lindop, & Thomas, 2013). Therefore, the study was conducted in Brazil, an emerging market context characterized by political and economic uncertainties, high ownership concentration, and low investor protection (Crisóstomo & Brandão, 2019; Santos & Coelho, 2018).

Based on the literature surveyed at international and national levels (Abraham & Shrives, 2014; Elshandidy *et al*., 2018; Hassan, 2009; Linsley & Shrives, 2006), it is observed that, despite not being a contemporary theme in Brazil, research on risk disclosure is still incipient and occasional (Cunha, Silva, & Fernandes, 2011; Almendra, Vasconcelos, Silva, & De Luca, 2018; Silva, Granemann, & Fischer, 2018), and no previous national study relating risk disclosure to corporate reputation was found.

Considering the legitimacy theory and the scenario presented, this research aims to analyze the possible association between the disclosure of non-financial risks and the (in) existence of corporate reputation in Brazil's largest publicly traded companies. For this purpose, the specific objectives were outlined as follows: (1) identify the determinants of the disclosure of non-financial risks; (2) investigate the association between the disclosure of non-financial risks, corporate reputation, and the sector in which the companies operate; (3) examine comparatively the disclosure of non-financial risks between companies classified with and without corporate reputation.

This research is of social relevance since it considers an empirical field with large companies operating in Brazil, which might help in understanding the interests of entities when making such disclosures and in predicting behaviors. Thus, this work expands the analysis of corporate reputation since it considers, from the perspective of sustainability, the organizations classified or not as having a corporate reputation, while exploring how the relationship between this reputation and the reporting of non-financial risks provided at different levels of information by the companies occurs.

2 LITERATURE REVIEW

2.1 Risk disclosure

Literature on risk disclosure has presented studies regarding the character of disclosure, some being focused only on the voluntary perspective (Barakat & Hussainey, 2013; Linsley & Shrives, 2006; Ntim, Lindop, & Thomas, 2013), while others focused on the perspective of mandatory character (Costa, Leal & Ponte, 2017; Filzen, 2015; Kravest & Muslu, 2013) and also, some pieces of research analyzed it thoroughly, i.e., voluntary and mandatory (Al-Hadi, Taylor & Al-Yahyaee, 2016; Elshandidy, Fraser & Hussainey, 2013; Elshandidy, Fraser & Hussainey, 2015).

As one of the factors which may explain the adoption of these information types, Elshandidy, Fraser, and Hussainey (2013) identified that companies with more exposure to risks tend to acknowledge a more significant amount of risk information, either voluntary- or mandatory-related. Furthermore, Elshandidy, Fraser and Hussainey (2015) analyzed British, German, and US compa-

nies to identify the occurrence and extent to which company and country characteristics influence voluntary and mandatory risk disclosures. The results indicate that variations in approaches to risk reporting stem from systematic risks, cultural values, and the country's legal system.

In Brazil, to adjust the country's rules with international standards, the Securities and Exchange Commission [CVM], in its Normative Instruction CVM No. 480/2009, established the Reference Form, which is a model for disclosure of quantitative and qualitative information (Klann, Kreuzberg, & Beck, 2014). This Instruction requires the practices and policies declaration of the most fragile aspects of the corporation, including information on risks (CVM, 2009). As a result, the description of risk factors related to the company's activities is one of the points requested in the Reference Form. All aspects of the risk that may impact the stakeholders' decision-making should be presented (Klann, Kreuzberg, & Beck, 2014).

In addition, Technical Pronouncement CPC 40 (R1), from June 1st, 2012, which accounts for disclosing financial instruments, reinforced the requirement of risk disclosure. In this document, Brazilian companies are subject to disclose quantitative and qualitative information about the risks to which they are exposed due to financial instruments and how these risks are managed (CPC, 2012). However, Brazilian publicly held corporations have the discretion to disclose information on risks. Although there is a specific section for the disclosure of risk factors in the Reference Form - section 4, companies can choose what and how to carry out this procedure, characterized, therefore, as voluntary disclosure. In conclusion, according to Clemente, Ribeiro, Silva and Oliveira (2019), companies seek to disclose information that is aligned with stakeholders' perspectives.

Moreover, the studies developed to pay attention to the category of risks researched, which may be financial and, or non-financial. In this sense, the financial risks are related to the companies' assets and liabilities (Amaral & Lemos, 2015) and the non-financial risks refer to other situations and circumstances that happen or may happen in companies, whether internal or not (Amaral & Lemos, 2015). Regarding the category of risks, there are works, like the present research, that focus on the analysis of disclosure of non-financial risks, such as that of Harper Ho (2018), who investigated the disclosure of non-financial risks and its relationship with private ordering costs, and that of Barakat and Hussainey (2013), who researched governance, regulation, supervision, and the disclosures of operational risks in European banks. Amaral and Lemos (2015), in turn, investigated the determinants of the level of financial risk disclosure in financial firms in Portugal. There are also works that set to address financial and non-financial risks, such as Linsley and Shrives (2006) and Miihkinen (2012).

The research considers, for risk-disclosure analysis, the combination of the subcategories of non-financial risks proposed in the studies of Linsley and Shrives (2006), operational, empowerment, information processing and technology, integrity, and strategic risks; Miihkinen (2012), strategic, operational, damage and management risks; and Ntim, Lindop, and Thomas (2013), operational/business and strategic.

The Operational Risks subcategory deals with internal processes, people or systems, and external events that have a loss effect on business (Coleman, 2011). Damage Risks, as pointed out by Miihkinen (2012), deal with losses caused by lawsuits and insufficient insurance coverage. Integrity Risks refer to the loss of the company's integrity, through fraud and illegal acts, for example (Linsley & Shrives, 2006). Whereas strategic risks refer to external events or conditions that may affect the company's decision-making within its operations (Kamaruzaman, Ghani, & Gunardi, 2019).

2.2 Corporate reputation and legitimacy theory

Research on corporate reputation has focused on three types of approaches: reputation as an asset, which is considered intangible and strategic within companies (Delgado-Garcia, Quevedo-Puente, & Díez-Esteban, 2013); as an evaluation, that is, arising from the moral assessment of

stakeholders; and as a perception, indicating that it originates from stakeholders' views, especially its customers (Barnett, Jermier, & Lafferty, 2006). In this study, corporate reputation is considered from the asset approach.

Evidence shows that corporate reputation is considered by some managers as one of the main intangible company assets (Barnett, Jermier, & Lafferty, 2006; Chun, 2005). From the literature, it can be said that the relationship between stakeholders and organizations is facilitated (Makarius, Stevens, & Tenhiälä, 2017). Therefore, it is associated with several strategic advantages, such as sustainable competitive benefits (Delgado-García, Quevedo-Puente, & Díez-Esteban, 2013), financial performance, higher margins, and prices (Walker, 2010), and increased cash flows (Robinson, Kleffner, & Bertels, 2011).

In this context, corporate reputation management is essential and can be strategically used through information disclosure so that companies with reputations seek to provide greater corporate transparency (Cardoso, De Luca, & Gallon, 2014). This is because stakeholders tend to prefer companies with a good reputation (Fombrun & Shanley, 1990), mainly because of their behaviors, such as product or service quality and transparency (Dowling, 1986).

From the perspective of risk disclosure, Bravo (2017), researching companies listed in the Standard & Poor's 500 Index for 2009, pointed out that corporate reputation mediates the relationship between risk disclosure and company value.

It is observed that in research conducted on corporate reputation and disclosure, some theories are employed, such as signaling (Freitas, Kobal, De Luca, & Vasconcelos, 2013), disclosure, or voluntary disclosure (Rover, Borba, & Murcia, 2009), and legitimacy (Conceição, Dourado, Baqueiro, Freire, & Brito 2011). The latter is the focus of this study, considering that, according to the legitimacy theory, from the disclosure of information, firms can achieve, maintain, or regain their legitimate status before society (Beuren, Gubiani, & Soares, 2013).

According to Aldaz, Alvarez, and Calvo (2015), disclosing information can help legitimize companies with worse performance. It is noteworthy that the legitimacy theory recognizes a contractual relationship between society and companies so that organizational activities seek to be aligned with the demands presented by these stakeholders, which leads them to achieve or maintain legitimacy (Dias Filho, 2013). Therefore, firms use strategies that help build and maintain legitimacy to be accepted in society and can continue consuming the resources necessary for their activities (Lieges, Zanchet, & Gomes, 2018).

The alignment with the legitimacy theory develops from the behavior and actions of companies performed to achieve acceptability before society (Lopes *et al*., 2017). This theory highlights the meeting of needs of various stakeholders through criteria that these parties consider acceptable and that have been constructed and legitimized socially, hence, allowing the establishment or maintenance of reputation (Fombrun & Shanley, 1990).

2.3 Previous empirical studies and formulation of the research hypothesis

The study of corporate reputation and risk disclosure, individually, has been widely developed, both internationally and nationally, but the relationship between them has been little explored. In this research, we suggest that there is a relationship between these two constructs since reputation can be a determining factor for the reporting of risks in corporate, institutional reports.

Kim and Yasuda (2018) point out that discretionary disclosure of corporate risk information is a challenge for investigation because it is the evidence of textual nature and unfavorable aspects. Solomon *et al*. (2000) point out that risk disclosure includes all types of risks that encompass a business, so the information should influence the decision-making of current or potential investors.

The very definition of risk directs to the idea of adverse conditions for organizations, as stated by Linsley and Shrives (2006). Moumen, Othman, and Hussainey (2015) highlight that, despite the increased number of studies, risk disclosure is still an ambiguous area in organizational disclosure. This fact occurs because, in general, even though regulation exists, companies avoid reporting on risks to diminish the unfavorable aspects of the business (Almendra *et al*., 2018; Polinsky & Shavell, 2012).

It is, therefore, noteworthy that stakeholders tend to be risk-averse; once, the alternative of two companies that present similarities in financial performance, the best reputation will be analyzed (Brammer & Millington, 2005; Fombrun & Shanley, 1990). In line with this proposition, Fombrun (2001) considers that the corporate reputation ranking impacts the companies' shares, either by the more terrific attractiveness to investors or by the decrease in stock value.

Eckert (2017), in his research, which focused on reputation risks, highlights that in addition to having an excellent corporate reputation, it is essential that risks be managed. Srivastava, McInish, Wood, and Capraro (1997), when investigated the relationship between reputation and systematic risk, found that the level of company reputation influences the acceptance of risk by investors, i.e., for companies with a higher reputation, there are more investors inclined to accept risks.

The study of Delgado-García, Quevedo-Puente, and Díez- Esteban (2013) in Spanish publicly traded companies, sought to analyze the effects of corporate reputation on systematic, non-systematic, and total risk. The study results determined that the company is respectable. In other words, having a corporate reputation reduces the unsystematic and total risk of the company; however, it increases the systematic risk. Furthermore, it was found that when it comes to risk, the critical aspect is not the corporate reputation level of the companies but whether they are reputable or not.

Similarly, Bakhsh, Akhtar and Akhtar (2019) on companies listed on the Pakistan Stock Exchange investigated the impact of reputation on risk exposure from 2007 to 2016. The results showed a negative relationship between reputation and the company's total, and systematic risks, while no significance was found with unsystematic risks.

Lopes *et al*. (2017) evidenced that corporate reputation can be seen to highlight the behavior of companies. Moreover, Bravo (2017) points out that reputation has an effect related to risk disclosure. From a similar perspective to this research, studies also show that companies with higher visibility present more disclosures (Aldaz, Alvarez, & Calvo, 2015; Cardoso, De Luca, & Gallon, 2014; Cruz & Lima, 2010), including on risks (Delgado-García, Quevedo-Puente, & Díez-Esteban, 2013; Oliveira, Rodrigues, & Craig, 2011).

Consequently, based on the legitimacy theory and the theoretical-empirical contributions presented; the following research hypothesis was formulated:

H1: Non-financial risk disclosure is associated with the existence of corporate reputation.

3 METHODOLOGICAL PROCEDURES

The research population comprises the companies listed on the 100 largest publicly- traded companies in Brazil displayed on Exame Magazine's "Best and Largest" from 2017 to 2019. Of the 119 companies that participated in at least one of the rankings in the period, only one was excluded because it had not submitted all the Reference Forms for the three years period under analysis. Consequently, the study sample gathered 118 companies and 345 Reference Forms for the three years analyzed, totaling 17,336 observations.

As for corporate reputation, it should be noted that there is no consensus as to how measuring corporate reputation is carried out (Ponzi, Fombrun, & Gardberg, 2011). Chun (2005) states that

the measurement tool will depend upon the approach adopted by the researcher. Some studies have been devised under the consideration of participation in sustainability indexes (Aldaz, Alvarez, & Calvo, 2015; Cardoso, De Luca, & Gallon, 2014), in the MERCO (Baraibar-Diez & Sotorrío, 2018; Perez-Cornejo, Quevedo-Puente, & Delgado-García, 2019) and media rankings (Cruz & Lima, 2010; De Luca *et al.*, 2015), and in the Reputation Institute's Reptrak (Ponzi, Fombrun, & Gardberg, 2011), among others.

The present study uses as a measure the participation of Brazilian publicly traded companies in the portfolios of the Corporate Sustainability Index (ISE) and, or the Carbon Efficient Index (ICO2) of the Brazilian stock exchange (B3). This proxy was chosen because this indicator evaluates economic efficiency, environmental balance, social justice, and corporate governance, and as pointed out by Cruz and Lima (2010), as, like the Dow Jones Sustainability Index (DJSI), used in the study by Michelon (2011). Because it is the Brazilian context, to capture a more environmental perspective and aim to cover more companies, the ICO2 will also be considered, according to Cardoso, De Luca, and Gallon (2014).

For corporate reputation, the presence of companies in the portfolios of the Corporate Sustainability Index (ISE) and, or the Carbon Efficient Index (ICO2) of B3 S.A. for the years 2016, 2017 and 2018 were analyzed. The ISE is a tool for comparative analysis of the performance of companies listed on B3 under the aspect of corporate sustainability, based on economic efficiency, environmental balance, social justice, and governance. It also broadens the understanding of companies and groups committed to sustainability, differentiating them in terms of quality, level of commitment to sustainable development, equity, transparency and accountability, nature of the product, and corporate performance in the economic-financial, social, environmental, and climate change dimensions (B3, 2019). The ICO2 was developed in partnership between B3 and the National Bank for Economic and Social Development (BNDES). This index considers each company's degree of greenhouse gas emissions efficiency and is composed of shares of companies participating in the IBrX50 index that adopt transparent practices regarding their greenhouse gas emissions (B3, 2019). For the analysis of the portfolios and operationalization of the corporate reputation variable (REP), a dummy was implemented in which the value 1 (one) was applied to the companies that participated in at least one of the B3 sustainability indexes (ISE and, or ICO2) and the value zero was applied to the companies that did not participate in any of these, in the triennium. As a result, the sample is represented by two groups of companies: Group 1, composed of companies that were part of the ISE and, or ICO2 in the period - considered in the study as "with a corporate reputation"; and Group 2, of companies that did not participate in the ISE and, or ICO2, considered as "without corporate reputation." This classification was made to compare these two groups, like the approach used by Cardoso, De Luca, and Gallon (2014) and Michelon (2011). Nevertheless, it should be noted that the measurement of the corporate reputation variable is limited since it could be constructed by looking at several aspects that interfere with reputation.

For the level of risk disclosure, according to theoretical support, the sample companies were analyzed in section 4 (Risk factors) of 2016, 2017, and 2018 Reference Forms, published in each year, respectively. To this end, a checklist developed from the studies of Linsley and Shrives (2006), Miihkinen (2012), and Ntim, Lindop, and Thomas (2013) was used as grounds for evaluation.

The research considers, for risk disclosure analysis, the combination of the subcategories of non-financial risks proposed in the studies of Linsley and Shrives (2006); operational, empowerment, information processing and technology, integrity, and strategic risks; Miihkinen (2012), strategic; operational, damage and management risks; and Ntim, Lindop and Thomas (2013), operational/business and strategic. Hence, the analysis of risk disclosure in the study examines the disclosure of risks in the non-financial category, divided into four subcategories, as presented in Figure 1.

Category: Corporate Non-Financial Risk Disclosures	
Subcategory	**Risk factors**
2.1 Operational risks	2.1.1 Effects of negative marketing (Customer boycott) 2.1.2 Third-party claims 2.1.3 Sudden unavailability of resources and/or problems in the sourcing of raw material 2.1.4 Risks in the production process and product development 2.1.5 Risk of infringement of industrial property rights and/or problems with their protection 2.1.6 Risk of failures in information technology and/or cyber risk 2.1.7 Risk of dependency and/or unavailability of the human resources 2.1.8 Risk of social and environmental issues 2.1.9 Risk of revenue shrinkage and/or significant discount risk due to stock obsolescence 2.1.10 Brand name erosion risk 2.1.11 Health and safety risk in the work environment
2.2 Damage risks	2.2.1 Risk of insufficient insurance coverage 2.2.2 Risk of unfavorable judicial decisions (significant legal actions)
2.3 Integrity risks	2.3.1 Internal or external fraudulent actions 2.3.2 Negative impact on the firm reputation or image 2.3.3 Occurrence of ethical problems and corruption in business
2.4 Strategic risks	2.4.1 High competitiveness level and unfair competition risks 2.4.2 Risk of industry-specific changes 2.4.3 Occurrence of geopolitical instabilities 2.4.4 Risk of regulatory changes 2.4.5 Risk of political changes including tax law changes (changes in legislation) 2.4.6 Risk of economic changes 2.4.7 Changes in inflation rate 2.4.8 Risk of occurrence of natural disasters and/or terrorist actions affecting the business environment 2.4.9 Risk of losing control over suppliers and/or risk of dependence on suppliers 2.4.10 Changes in customer preferences 2.4.11 Risk of losing control over customers and/or risk of dependence on customers 2.4.12 Risks associated with the launch of new products 2.4.13 Risks associated with preparing and executing mergers and acquisitions in the business 2.4.14 Political risk sovereign bond 2.4.15 Risks associated with business-portfolio diversification

Figure 1. Categories, subcategories, and risk factors
Source: Authors' analysis.

The checklist (Figure 1) was used as the grounds for the collection and documented analysis of the companies' risk sections (Reference Form - Section 4). The measurement of the level of non-financial risk disclosure occurred departing from the analysis of each factor, according to a point scale proposed by Van Staden and Hooks (2007), as shown in Figure 2.

Score	Disclosure Level	Description
0	Not disclosed	No comments on the risk factor or disclosure that is not subject to the factor.
1	Minimum coverage	Qualitative information with briefly mentioned. Small details in descriptive terms.
2	Descriptive	Qualitative information with an explanation of the sources of risk. Policies of risk are evidenced.
3	Quantitative	Quantitative information with brief mention. Small details in monetary terms or actual physical quantities.
4	Exhaustively disclosed	Quantitative information with an explanation of the sources of risk. Policies, impact, and / or likelihood of risk are evidenced.

Figure 2. The disclosure level scale
Source: Van Staden and Hooks (2007).

According to Figure 2, it can be observed that the higher the quality of risk factor disclosure, the higher the score obtained by the company. This way, each risk factor (Figure 1) has a maximum score of 4 points, totaling an overall level of disclosure of non-financial risks (category) of 124 points per year, distributed in the following subcategories: 44 points in operational risks, 8 points in the subcategory damage risks, 12 points in integrity risks, and 60 points in strategic risks.

After collection, the data were tabulated using the Microsoft Excel tool and analyzed using the Statistical Package for the Social Sciences (SPSS) software so that the objectives were met by different analytical procedures.

At first, a documented analysis of the Reference Forms was proceeded, with an application of the checklist and the measurement scale (Figures 1 and 2), to identify the level of disclosure of non-financial risks in the Brazilian public companies belonging to the sample.

For the first specific objective, the factors determining the disclosure of non-financial risks were identified based on a Regression Tree. To meet this purpose, the 31 risk factors of the four subcategories of non-financial risks investigated were considered. Classification and Regression Trees (CRT) are one of the most widely used methodologies in data mining studies and can be considered as non-parametric regression models; the models are adjusted by successive binary divisions in the data set in order to make the resulting subsets increasingly homogeneous, concerning the response variable; these divisions are represented by a binary tree structure, in which each node corresponds to a division in a particular covariate (Pedro, Ferreira, & Mendes, 2010). The model validation was done using half of the sample as the modeling sample and the other half as the validation sample (Pedro, Ferreira, & Mendes, 2010). Since the response variable is quantitative (non-financial risk disclosure), the model is called a regression tree.

For the second specific objective, about the association between the level of risk disclosure and corporate reputation, in the sector of operation, the multiple correspondence analysis (MCA) was used. This procedure makes it possible to identify statistical significance regarding the association between the variables. For this purpose, it was necessary to process the quantitative data of non-financial risk disclosure (total score) to build the qualitative indicator of the level of risk disclosure. Thus, the quartiles of the overall total score of the non-financial risk category and each subcategory were considered. Four quartiles were adopted to evaluate the level of companies' non-financial risk disclosure, which are: Very Low, Low, High, and Very High. Therefore, in assessing the overall disclosure level, for example, up to 29 points are considered a shallow level, and above 43 points a very high level. Similarly, each subcategory of non-financial risks (operational, damage, integrity, and strategic) presents scores for each level, as in the subcategory of damage risks, up to 4 points is a very low level of disclosure, and above 23 points for a very high level of disclosure in the subcategory of strategic risks. Based on the MCA, perceptual maps demonstrate the possible association between disclosure levels, corporate reputation (or not), and the sector of the companies, considering the general level of non-financial risk disclosure, as well as its subcategories (Figure 1): operational, integrity, damage, and strategic risks.

To achieve the third specific The T-test for independent samples was applied, considering the number of observations and their distribution, according to the Central Limit Theorem. In this research, the T-test was applied to examine risk disclosure by comparing independent samples based on the distribution of the sample companies in terms of corporate reputation. The purpose is to investigate statistically significant evidence of possible differences in the risk disclosure evidenced by the groups of companies with and without corporate reputation, considering the overall level of non-financial risk disclosure, as well as its four subcategories.

4 RESULTS AND DISCUSSIONS

4.1 Determinants of non-financial risk disclosure

To meet the first specific objective, verification was performed on the risk factors employing the Regression Tree (CRT). This way, the Regression Tree model of the dependent variable DR (non-financial risk disclosure) as a function of the individual risk factors analyzed (Figure 1) is presented in Figure 3.

Since the CRT method is developed to maximize homogeneity within nodes, the extent to which a node does not represent a homogeneous set of cases is an indicator of impurity (Pedro, Ferreira, & Mendes, 2010). Thus, the impurity measure used was the LSD (least-squared deviation). In the construction of the tree, the LSD only creates partitions in which the difference between the variance of the ascending node and the sum of the variances of the two descending nodes (weighted by the proportion of cases in each node) is more significant than a defined value, and the value 0.0001 was chosen.

The pruning technique was applied to reduce the complexity of the tree without jeopardizing the quality of adjustment and to avoid the problem of overfitting, that is, to avoid overfitting to the modeling sample, which cannot be generalized to other samples. The quality of the fit of the models was evaluated through the estimated risk that represents the variance within nodes, which is the part of the total variance not explained by the model. The lower the estimated risk, the better the model. The model validation, which allows verifying to what extent the adjusted tree structure can be generalized to other observations, was done using half of the sample as a modeling sample and the other half as a validation sample (Pedro, Ferreira, & Mendes, 2010).

It can be seen from Figure 3 that the companies with the highest DR (disclosure of non-financial risks) are found in node 22 with a mean of 48.600 and standard deviation of 6.883, being those that presented: Factor 2.4.8 - Risk of occurrence of natural disasters affecting the business environment above 1.5; Factor 2. 4.9 - Risk of loss of control over suppliers and, or risk of dependence on suppliers below 2.5; Factor 2.3.3 - Risk of ethical problems and corruption in business above 1.5; and Factor 2.3.2 - Risk of negative impact on the company's reputation or image above 1.5.

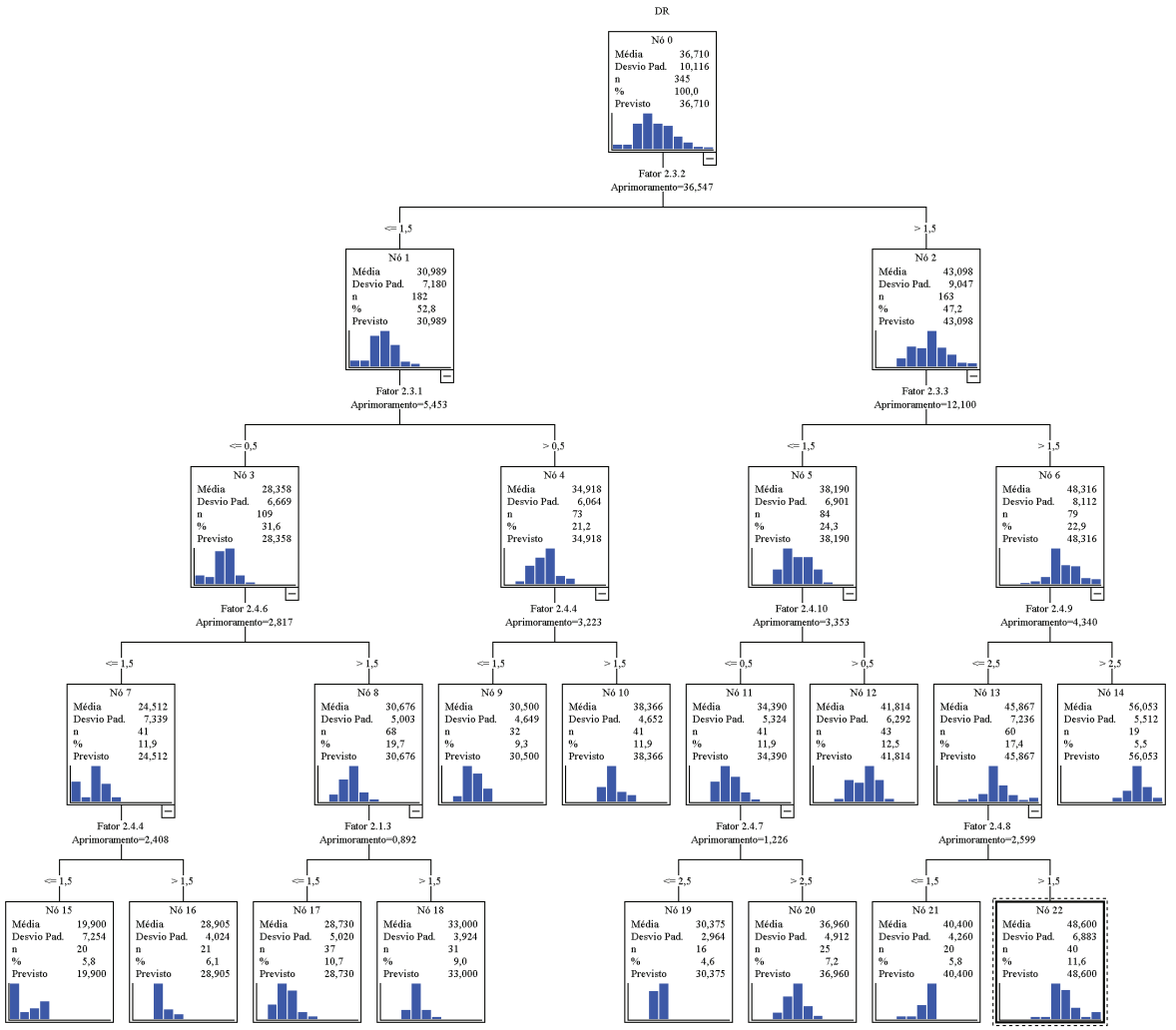

Figure 3. Tree regression
Source: Research data.

In the opposite direction, we find in the fifteenth node the companies with the lowest DR (disclosure of non-financial risks), with a mean of 19.900 and standard deviation of 7.254, being those that presented: Factor 2.4.4 - Risk of regulatory changes lower or equal to 1.5; Factor 2. 4.6 - Risk of economic changes less than or equal to 1.5; Factor 2.3.1 - Risk of internal or external fraudulent actions less than or equal to 0.5; and Factor 2.3.2 - Risk of negative impact on the company's reputation or image less than or equal to 1.5.

The estimated risk for the modeling sample was 27.075, with a standard error of 2.410. For the validation sample, an estimated risk of 40.386 was obtained with a standard error of 3.099. The values obtained for the estimated risk in the two samples indicate that no overfitting occurred, with the estimated risk being higher in the validation sample.

The main characteristics of the terminal nodes of the regression tree fitted to the modeling sample are shown in Table 1, which indicates to which terminal node a new individual will belong, and the respective non-financial risk disclosure can be estimated by the average of that node.

Table 1. Drivers of non-financial risk disclosure (DR)

Node	Number of observations	DR		Independent variables	
		Mean	Standard deviation	Determining factors	Divided values
0	345	36,71	10,116		
1	182	30,99	7,180	Factor 2.3.2 - Risk of negative impact on the company's reputation or image	<= 1,5
2	163	43,10	9,047		> 1,5
3	109	28,36	6,669	Factor 2.3.1 - Risk of internal or external fraudulent actions	<= 0,5
4	73	34,92	6,064		> 0,5
5	84	38,19	6,901	Factor 2.3.3 - Risk of ethical problems and corruption in business	<= 1,5
6	79	48,32	8,112		> 1,5
7	41	24,51	7,339	Factor 2.4.6 - Risk of economic changes	<= 1,5
8	68	30,68	5,003		> 1,5
9	32	30,50	4,649	Factor 2.4.4 - Risk of regulatory changes	<= 1,5
10	41	38,37	4,652		> 1,5
11	41	34,39	5,324	Factor 2.4.10 - Risk of changes in customer preferences	<= 0,5
12	43	41,81	6,292		> 0,5
13	60	45,87	7,236	Factor 2.4.9 - Risk of loss of control over suppliers and/or risk of dependency on inferior suppliers	<= 2,5
14	19	56,05	5,512		> 2,5
15	20	19,90	7,254	Factor 2.4.4 - Risk of regulatory changes	<= 1,5
16	21	28,90	4,024		> 1,5
17	37	28,73	5,020	Factor 2.1.3 - Risk of sudden unavailability of resources and/or problems in the supply of raw materials	<= 1,5
18	31	33,00	3,924		> 1,5
19	16	30,37	2,964	Factor 2.4.7 - Risk of changes in the inflation rate	<= 2,5
20	25	36,96	4,912		> 2,5
21	20	40,40	4,260	Factor 2.4.8 - Risk of natural disasters affecting the business environment	<= 1,5
22	40	48,60	6,883		> 1,5

Source: Research data.

It is worth mentioning that the risk factors corresponding to the subcategory Integrity were those that presented the highest importance in the model: Factor 2.3.3 Risk of ethical problems and corruption in business (47,267); and Factor 2.3.2 Risk of negative impact on the company's reputation or image (39,652). Factor 2.3.1 Risk of internal or external fraudulent actions, in turn, was the eighth most crucial variable for the model (30.203).

This finding indicates that risks related to losses caused by fraud and illegal acts, for instance, can directly impact risk disclosure. At this point, the proximity of the factors in the integrity risk subcategory to corporate reputation stands out. During the analyses of the Reference Forms, the existence of anti-corruption operations unfavorable to some companies was observed, as is the case of the "Weak Meat" operation.

4.2 Association between risk disclosure, corporate reputation, and industry sector

To achieve the research's second specific objective, the Multiple Correspondence Analysis (MCA) was used, and the Chi-square test was initially performed. It is worth mentioning that to perform MCA, the quartile-based risk disclosure level was used. By doing so, the following values were established for the non-financial risk disclosure category (General) through the four levels: Very Low (up to 29 points), Low (29.1 to 35), High (35.1 to 43), and Very High (above 43). Considering these levels, Figure 4 shows the perceptual map with the results of the association analysis between the general level of non-financial risk disclosure, corporate reputation, and the sector in which companies operate.

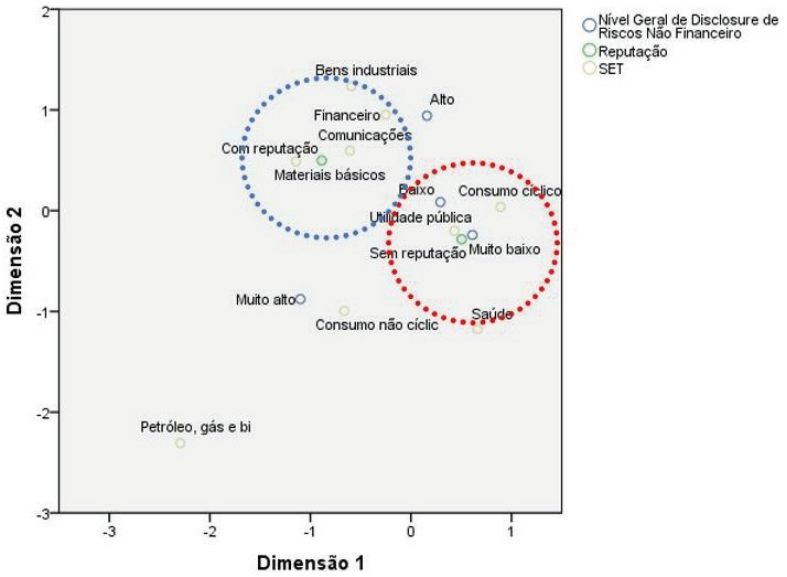

Figure 4. Perceptual map of multiple correspondences between the overall level of non-financial risk disclosure, corporate reputation, and industry sector
Source: Research data.

From the proximities shown in Figure 4, it can be inferred that companies classified without corporate reputation presented low and very low levels of non-financial risk disclosure, with more significant presence in the Public Utility and Cyclical Consumption sectors. On the other hand, regarding companies with corporate reputation, these are associated with the sectors of Industrial Goods, Basic Materials, Finance, and Communications but are not close to any of the specifically established risk disclosure levels.

This finding aligns with studies that indicate corporate reputation as a preponderant factor for greater corporate transparency since one observes the absence of reputation and lower levels of non-financial risk disclosure. Oliveira, Rodrigues and Craig (2011) pointed out that companies with higher visibility have higher disclosure levels. Starks (2009) argued that firms' reputation impacts their risks. Furthermore, Gunawan and Elsa (2020) stated that companies with reputations show financial and non-financial information about risks in their reports. However, it is noted that in the Brazilian companies investigated. It was not possible to find an association between a high or very high level of non-financial risk disclosure and the existence of reputation. The association between the three organizational aspects was only evident in the group without a corporate reputation.

In a complementary manner, for improved understanding of the association between the constructs studied, new analyses were conducted regarding the specific relationship between the level of disclosure of non-financial risks through its four subcategories (operational, damage, integrity and strategic), reputation and the sector in which companies operate. As in the general category (Figure 4), quartiles were also adopted for the subcategories to classify disclosure levels into Very Low, Low, High, and Very High. The results found are briefly described below.

From the disclosure of information of the subcategory operational risks, it was observed that companies without reputation in the Cyclical Consumption and Healthcare sectors presented a low level of disclosure, and companies in the Utility sector presented a high level of operational risk disclosure. On the other hand, companies with a corporate reputation in the Basic Materials and Industrial Goods sectors showed no relationship with operational risk disclosure levels. This result by the operational risk subcategory reinforces the finding of the association of public non-financial

risk disclosure (Figure 4), in which it cannot be said that companies with corporate reputations are associated with higher levels of risk disclosure.

As for the association between the disclosure level of the damage risk subcategory, corporate reputation, and sector, proximity between companies without reputation was noticed alongside the disclosure of damage risks of Low level and the cyclical consumption sector, and high level in the Public Utilities sector. However, it is identified that companies with reputation, operating in the Industrial Goods, Non-Cyclical Consumption, and financial sectors are associated with a very low level of damage risk disclosure.

This result indicates that companies in the Utilities sector, which are related to services such as electric power, water and sanitation, and gas, present a higher level of disclosure related to the risk of lawsuits and insufficient insurance coverage, which are, according to Miihkinen (2012), covered by damage risks. This is an indication of the vulnerability of these companies to the occurrence of events for which there is no or insufficient insurance, as well as for lawsuits motivated by various factors such as lack of energy, water, or gas. To corroborate this proposition, we observe the report of the company Comgás, a participant in the gas segment, with respect to damage risks, insufficient insurance coverage factor in its 2018 Reference Form, page 4:

> Liabilities arising from such interruptions or disturbances that are not covered by the Company's insurance policies or that exceed the limits of coverage may result in significant additional costs, which could have a material adverse effect on the Company's financial condition and results of operations. (...) The Company's insurance policies may not be sufficient to fully cover liabilities that may be attributable to the Company in the ordinary course of business. (...) The Company's results of operations may be adversely affected by the occurrence of accidents resulting in damages for which the Company is not fully covered under its existing insurance policies.

Given that, the analysis of the association between the level of disclosure of the integrity risk subcategory, corporate reputation and industry sector revealed that companies with a good reputation in the non-cyclical consumption sector had a very high level of integrity risk disclosure. On the other hand, companies without reputation in the Public Utilities sector had a very low level of disclosure on integrity risk information.

It is noteworthy that the Non-Cyclical Consumption sector, associated with the group of companies with corporate reputation and a very high level of disclosure, deals with essential products or services that are independent of economic cycles. According to Linsley and Shrives (2006), integrity risks are related to aspects such as fraud and ethical problems, i.e., events that can impact the integrity of companies. Therefore, it was found that companies with a reputation in this sector are more interested in performing these disclosures, which may be related to episodes of fraud that have already occurred in the sector, such as Operation "Weak Meat". To demonstrate this relationship, we present an excerpt reported by the company BRF in its 2017 Reference Form, page 30:

> (...) The Company has a framework of anti-fraud initiatives, including anti-bribery and anti-corruption, that supports all business segments and business patterns worldwide. However, the Company is not able to fully mitigate all fraud risks. Possible violations of anti-corruption laws have been identified from time to time as part of BRF's compliance and internal control processes. In addition, the Company was recently notified of allegations involving possible misconduct by some of its employees in connection with "Operação Carne Fraca".

In sequence, the analysis of the association between the level of disclosure of the subcategory strategic risks, corporate reputation and the sector of the companies revealed that companies

with no reputation in the Healthcare sector presented a low level of disclosure of strategic risks, while companies with a reputation in the Industrial Goods, Financial and Non-cyclical Consumer Goods sectors present a very high level of disclosure of strategic risks. Thus, it can be inferred that the companies without corporate reputation that were analyzed did not tend to disclose their strategic risks and those that still do so with fewer details.

In summary, it was found, based on the MCA and chi-square tests, that there is no clear association between companies with corporate reputation, the general level of non-financial risk disclosure and the sector of the companies. However, the associations between the level of non-financial risk disclosure in the subcategories of integrity and strategic risks, the sector and the existence of corporate reputation were significant.

4.3 Risk disclosure: comparison between companies with and without reputation

To achieve the third specific objective of comparatively examining the disclosure of non-financial risks between companies classified with and without corporate reputation, the T-test was performed, whose results are shown in Table 2.

Table 2. Behavior of non-financial risk disclosure (general and by subcategory) in companies classified with and without corporate reputation

Variables	Groups	N	Means	Standard deviation	Sig	T
Disclosure of non-financial risks (overall)	With reputation	125	39,22	10,939	0,001(*)	3,406
	Without reputation	220	35,25	9,367		
Disclosure of operation risks	With reputation	125	9,59	5,182	0,291	1,06
	Without reputation	220	9,03	3,768		
Disclosure of damage risks	With reputation	125	5,15	1,04	0,305	-1,027
	Without reputation	220	5,27	1,055		
Disclosure of integrity risks	With reputation	125	3,28	2,51	0,073(***)	1,801
	Without reputation	220	2,8	2,2		
Disclosure of strategic risks	With reputation	125	21,19	5,638	0,000(*)	4,574
	Without reputation	220	18,19	5,993*		

Note: (*): significant to 0,001; (**): significant to 0,05; (***) significant to 0,10.
Source: Research data.

The results of the independent t-test showed that the variables non-financial risk disclosure (general), operational risk disclosure, integrity risk disclosure and strategic risk disclosure behave differently when comparing companies with and without corporate reputation. Specifically, it can be statistically verified that (i) firms with reputation exhibit higher overall level of non-financial risk disclosure than firms without reputation ($t(345)=3.406$; $p<0.05$); (ii) firms with reputation exhibit higher disclosure of the integrity risks subcategory than firms without corporate reputation ($t(345)= 1.801$; $p<0.10$); and (iii) firms with reputation exhibit higher disclosure of the strategic risks subcategory than firms without corporate reputation ($t(345)= 1.867$; $p<0.01$).

Therefore, the results presented in Table 2 indicate that companies classified as having a reputation present a better overall level of disclosure of non-financial risks in relation to companies classified as having no reputation, a fact that is in line with the assumptions of the legitimacy theory. This finding is also confirmed for the disclosure of information on integrity and strategic risks. These results can be understood from Fobrum's (2001) recommendations that having a corporate reputa-

tion affects a company's actions. Complementarily, Delgado-García, Quevedo-Puente and Díez- Esteban (2013) and Oliveira, Rodrigues and Craig (2011) pointed out that companies that have greater visibility present greater disclosure on risks.

5 FINAL CONSIDERATIONS

Considering the competitive business environment and the need to present differentials to their stakeholders, companies use attributes such as corporate reputation. Reputation is considered a competitive advantage and from the perspective of transparency, it uses the disclosure of information to legitimize itself socially. In the context of 118 companies listed on Exame magazine's ranking of the "100 largest publicly traded companies" from 2017 to 2019, this research proposed to analyze the possible association between the disclosure of non-financial risks and corporate reputation, considering, for greater depth of the proposed analysis, the subcategories of operational, damage, integrity, and strategic risks.

To this end, we resorted to a careful analysis of the literature on the two constructs at the national and international levels, highlighting the few national studies on risk disclosure, especially investigating the relationship with corporate reputation. Moreover, the research was supported by legitimacy theory, considering that risk reporting and reputation can be used to legitimize oneself.

The results of the analysis of the nodes of the Regression Tree (CRT) indicated that the risk factors in the subcategory of integrity risks were of greater importance and were identified as determinants of non-financial risk disclosure.

From the Multiple Correspondence Analysis (MCA), through perceptual maps, associations were identified between the level of risk disclosure (general and by subcategories), corporate reputation and the sector in which companies operate. From the proximities evidenced, it was identified an association between: a) Low and Very Low non-financial risk disclosure and companies with no reputation in the Public Utilities and Cyclical Consumption sectors; b) disclosure of integrity and strategic risks, both with a Very High level of disclosure, and companies with a reputation in the Industrial Goods, Non-Cyclical Consumption and Financial sectors; c) companies with a reputation, operating in the Industrial Goods, Non-Cyclical Consumption and Financial sectors, and a Very Low level of damage risk disclosure.

Furthermore, the results of the T-test for independent samples revealed differences in the disclosure of non-financial risks (overall and by subcategory) between companies with and without corporate reputation. Thus, after applying the tests for differences between means, it was confirmed that, in general terms, companies with a good reputation present higher non-financial risk disclosures than the others, a behavior that is confirmed in relation to the subcategories of integrity and strategic risks.

In sum, the results showed that companies with reputation presented more information about non-financial risks in general in their institutional reports. Thus, the research hypothesis was accepted.

As a research contribution, the study of corporate reputation stands out as a variable that may be related to the disclosure of non-financial risks, being an indication of attention for investors and the stock market in general. Considering that the risk disclosures are, in parts, of discretionary character, since the reports depend on institutional motivations, the research signals a concern of the Brazilian companies in informing the stakeholders about the risk factors related to the studied risk subcategories, especially in companies that have corporate reputation.

It is noteworthy that the disclosure of non-financial risks in companies was explored in the research both through general categories, and through four subcategories, which allowed a greater level of detailing about these constructs. For academia, it is also worth mentioning the investigation of this relationship in publicly traded companies from an emerging country with few empirical studies on the subject.

However, despite the care taken in proposing the hypothesis and the methodological design used, the research presented limitations. The first refers to the population used, which was chosen intentionally, which prevents the generalization of the results found. The second refers to the difficulty in using a metric to capture corporate reputation and the quality of risk disclosure, since there is no consensus in the literature. Specifically in relation to corporate reputation, its evaluation could be constructed by looking at several aspects that interfere with reputation. It is also noteworthy that the period of analysis is limited to the period prior to the pandemic context that began in 2020 in Brazil.

Given this, it is suggested that future research explores other metrics for corporate reputation, such as qualitative analysis, also applying them to a larger group of companies. Furthermore, it is suggested that the two constructs in question be investigated in a cross-country manner, as well as the use of panel data analysis and the perspective of causality, given the relationship signaled in this research between them.

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2. Development of hypotheses or research questions (empirical studies)	√	√	√
3. Development of theoretical propositions (theoretical work)	√		√
4. Theoretical foundation / Literature review	√		√
5. Definition of methodological procedures		√	
6. Data collection	√	√	
7. Statistical analysis	√	√	
8. Analysis and interpretation of data	√	√	
9. Critical revision of the manuscript		√	√
10. Manuscript writing	√	√	√
11. Other (please specify)			

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The authors have stated that there is no conflict of interest.

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