INFLUENCE OF ESG INFORMATION DISCLOSED ON SOCIAL MEDIA IN EARNINGS INFORMATIVENESS

Caroline Keidann Soschinski [1]
Inaê de Sousa Barbosa [2]
Roberto Carlos Klann [3]

ABSTRACT

This research assumes that companies engaged in environmental, social and governance (ESG) practices have more informative earnings, given that they disclose complementary information about their business reality. With the use of social media, it is expected that the earnings informativeness of ESG companies will be enhanced, since such practices will have greater visibility to various stakeholders. Based on this context, this research aims to evaluate the effect of ESG information disclosed on social media on the earnings informativeness in Brazilian companies. The research considered 723 company/year observations of Brazilian companies listed in the São Paulo Stock Exchange (B3) during the period from 2015 to 2019. The results indicated that, in the Brazilian context, unexpected earnings are not informative in themselves and that ESG disclosure is not perceived by market participants as complementary information to financial reports. Moreover, it was identified that, although Brazilian companies engaged in ESG have higher unexpected earnings, these were not informative for the financial market. In general, it was identified that social media can be efficient communication channels for disclosing ESG information to the market; however, higher levels of engagement in ESG practices seem to nullify the positive effects provided by the use of media. Accordingly, it is concluded that Brazilian companied that have ESG practices and disclose such information on social media do not have advantages in terms of earnings informativeness. In general, it was found that social media can be efficient communication channels for disseminating ESG information to the market, however, higher levels of engagement in ESG practices seem to cancel out the positive effects provided by the use of the media. Accordingly, it can be concluded that Brazilian companies that have ESG reports and disseminate this information on social media do not have advantages in terms of earnings informativeness.

[1] Doutora em Ciências Contábeis e Administração, Universidade Comunitária Da Região De Chapecó – Unochapecó, Servidão Anjo da Guarda, 295-D - Efapi, Chapecó – SC, 89809-900, (55) 99613-6022, carolinesoschinski@yahoo.com.br
https://orcid.org/0000-0002-0135-0729

[2] Mestre em Ciências Contábeis, Universidade Regional De Blumenau – Furb, Rua Antônio da Veiga, 140, Itoupava Seca, Blumenau – 89030-903, (47) 99774-1845, isbarbosa@furb.br
https://orcid.org/0000-0002-9194-823X

[3] Doutor em Ciências Contábeis e Administração Universidade Regional de Bluemanu – Furb, Rua Antônio da Veiga, 140, Itoupava Seca, Blumenau – SC, 89030-903, (47) 98469-2252, rklann@furb.br
https://orcid.org/0000-0002-3498-0938

INFLUÊNCIA DAS INFORMAÇÕES ESG DIVULGADAS EM MÍDIAS SOCIAIS NA INFORMATIVIDADE DOS LUCROS

RESUMO

Esta pesquisa parte do pressuposto de que empresas engajadas em práticas ambientais, sociais e de governança (ESG) possuem lucros mais informativos, uma vez que divulgam informações complementares sobre sua realidade empresarial. Com o uso das mídias sociais, espera-se que a informatividade dos lucros de empresas ESG seja potencializada, visto que tais práticas terão maior visibilidade perante diversas partes interessadas. Com base nesse contexto, esta pesquisa tem como objetivo avaliar o efeito das informações ESG divulgadas em mídias sociais na informatividade dos lucros em empresas públicas brasileiras. A pesquisa considerou 723 observações empresas/ano de empresas brasileiras listadas na Bolsa de Valores de São Paulo (B3), durante o período de 2015 a 2019. Os resultados indicaram que, no contexto brasileiro, os lucros inesperados não são informativos por si só e, ainda, que a divulgação ESG não é percebida pelos participantes do mercado como informação complementar aos relatórios financeiros. Além disso, identificou-se que, embora empresas brasileiras engajadas em ESG possuam lucros inesperados maiores, estes não se mostraram informativos para o mercado financeiro. De modo geral, identificou-se que as mídias sociais podem ser canais de comunicação eficientes para a disseminação de informações ESG para o mercado, no entanto, níveis maiores de engajamento em práticas ESG parecem anular os efeitos positivos proporcionados pelo uso da mídia. Com isso, conclui-se que as empresas brasileiras que possuem relatórios ESG e divulgam tais informações em mídias sociais não possuem vantagens em termos de informatividade dos lucros.

Palavras-Chave: ESG. Mídia Social. Informatividade dos Lucros.

1 INTRODUCTION

The topic involving environmental, social and governance (ESG) information has recently become an emerging issue around the world. This highlight is due to the positive effects that organizations have been identifying through engagement with such practices (Xu et al., 2020). As examples of positive effects, one can mention lower unsystematic risk (Lee & Faff, 2009), lower cost of capital and higher valuation (El Ghoul et al., 2011; Dhaliwal et al., 2011; Ng and Rezaee, 2015), positive evaluations from analysts (Bushee & Noe, 2000), among others.

Research has also shown that ESG information generates benefits for organizations in the capital market. Bona-Sánchez et al. (2017), Cheng and Wahid (2017) and Swarnapali (2019) demonstrated that ESG information is perceived by market participants as a complementary disclosure to financial statements. Accordingly, the earnings informativeness proved to be greater for companies engaged with these practices, since they are perceived as companies that

promote long-term relationships with their stakeholders (Bona-Sánchez et al., 2017), in addition to revealing how current earnings can map future performance through non-financial information (Cheng & Wahid, 2017).

Nevertheless, Cheng and Wahid (2017) highlight that the ESG benefit of increasing the earnings informativeness is an empirical issue. The authors note that this non-financial information may not have a significant impact on the way investors interpret earnings information. As an argument, the authors highlight that there can be a significant cost for investors and analysts when processing the large amount of information disclosed in ESG reports. Moreover, the lack of comparability of these reports causes potential credibility problems and gives rise to opportunistic behavior by managers.

In Brazil, divergent evidence on the impact of ESG practices on the capital market has been identified. A non-significant relationship between the themes was evidenced by Freguete et al. (2015), who demonstrated that, in periods of crisis, there are no differences in financial performance for companies engaged and not engaged in ESG. Silva and Callado (2020) showed that the fact that the companies are listed in the Global 100 ranking (related to sustainability) did not generate any impact on the accumulated abnormal returns of shares.

A negative relationship between ESG involvement and the capital market was evidenced by Salgado et al. (2013), who demonstrated that the companies that invested the most in social issues were those that presented the lowest return to shareholders. Conversely, a positive relationship between the themes was highlighted by Martins et al. (2015), who found that the inclusion of companies in the Corporate Sustainability Index (CSI) generated positive abnormal returns in the stock market.

As can be seen, the results of studies in Brazil that investigated the impact of non-financial information on the capital market were divergent. Among the possible justifications, we address what was highlighted by Cheng and Wahid (2017), when they argued that often the information disclosed in sustainability reports is already available in other sources, which means that the report itself ends up not being relevant to investors. Based on this, this research aims to shed light on a source of information increasingly used by organizations: social media.

According to Blankespoor et al. (2013), social media have been gaining space in the organizational environment, since they facilitate the dissemination of information, especially voluntary. For the authors, the media enable the dissemination of information in a fast, comprehensive and less costly way, compared to the information disclosed in statements. In fact, at the Brazilian level, research such as that of Giordani et al. (2019) found that Facebook and Twitter have a positive relationship with socially responsible practices. These results reflect that social media can be considered as facilitating channels for companies to disseminate information, mainly due to their low cost and quick access.

Nonetheless, little is known about how the social media channel can boost the potential of ESG information to impact the capital market, and more specifically, earnings information. Considering this context, this research aims to evaluate the effect of ESG information disclosed on social media on earnings informativeness. The premise supported by this article is that social media can be

responsible for enhancing the dissemination of engagement in ESG practices, in order to generate greater visibility for these companies. Consequently, this greater visibility can influence the potential impact of ESG practices on earnings informativeness.

This study differs from previous studies in different ways. In Brazil, studies have focused on investigating the abnormal return of actions around the advertisements of companies belonging to sustainability rankings (Silva & Callado, 2020), or on the participation of companies in terms of CSI (Salgado et al., 2013; Martins et al., 2015; Freguete et al, 2015). This study, on the other hand, investigates the disclosure of information on the three ESG (Environmental, Social and Governance) pillars, evaluated by criteria pre-established by the Refinitiv database and internationally recognized, which also allows for greater comparability.

Regarding the impact on the capital market, Brazilian studies have focused on evaluating abnormal returns of shares. Based on international studies, this research aims to investigate the earnings informativeness proxy, which reflects how much ESG information, together with the unexpected earning portion, is incorporated by the abnormal return. Thus, this measure captures how much the statement on non-financial information can complement the earnings informativeness.

As contributions, it seeks to help mainly Brazilian companies, which when deciding on their investments in ESG practices, can take into account the potential benefits of these practices in the capital market. In addition, companies can pay attention to the use of social media, as a less costly and quickly accessible way, which can enhance the visibility of non-financial information, in order to achieve greater reach and influence the perception of investors.

2 BACKGROUND AND RESEARCH HYPOTHESES

In Brazil, ESG practices have been gaining ground. In the first half of 2020, several news items in the international and Brazilian media highlighted these issues, when dealing with the possibility of European investors giving up on investing in Brazil due to deforestation (Forbes, 2020); about the fact that companies that do not have environmental liabilities or a sustainability agenda receive less investment or have to pay more to access financing (InfoMoney, 2020a); and, also, about the growing importance given to ESG information in the capital market: "ESG – the three letters that have been changing the stock market" (InfoMoney, 2020b).

In fact, the international literature has highlighted the pressure from investors and stakeholders for information on the socially responsible behavior of organizations. This behavior is required because, according to Bona-Sánchez et al., (2017), these users perceive the potential benefits of ESG actions in the long term, such as lower unsystematic risk (Lee & Faff, 2009), lower cost of capital, higher valuation (El Ghoul et al., 2011; Dhaliwal et al., 2011; Ng and Rezaee, 2015) and positive reviews from analysts (Bushee & Noe, 2000).

To exemplify the benefits of ESG practices, one can mention the fact that engaged companies tend to have better working conditions for their employees,

better relationships with their customers, which, consequently, tends to reduce the confrontation of operational problems. Customers and employees, because they are satisfied, tend to make fewer interruptions in the relationship with organizations, which reduces regulatory and legal issues that could pose a significant risk to the company and its reputation (Bona-Sánchez et al., 2017).

In addition, by improving the well-being of the workforce, ESG practices are able to attract new talent and motivate employees to improve productivity, which is likely to translate into better future financial performance. Also, by engaging in such practices, companies belonging to highly regulated sectors can have their reputation improved and positive media coverage. Finally, for conscious customers, ESG actions can improve the evaluation of products and, consequently, the number of sales and the reputation of the company (Dhaliwal et al., 2012).

Empirically, international research such as those by Bona-Sánchez et al. (2017), Cheng and Wahid (2017) and Swarnapali (2019) have shown that investors are visualizing the potential benefits of these practices and are considering this behavior when deciding on their investments. Research has found that, in addition to the benefits mentioned above, the capital market has also considered non-financial ESG information as complementary to financial information. This perception makes the earnings of companies engaged in ESG more informative in the stock market.

Bona-Sánchez et al. (2017) evidenced a positive effect of the social responsibility reporting on earnings reports in publicly traded companies listed in the Spanish stock exchange during the years 2003 to 2012. For the authors, these results were consistent with the premise that the disclosure of socially responsible information is perceived by market participants as an organizational attempt to promote a long-term relationship with its stakeholders, besides managing reputational risks.

In the United States, in an analysis of companies listed in the S&P500 index during the years 2006 to 2013, Cheng and Wahid (2017) demonstrated that the first voluntary adoption of ESG reporting was positively related to earnings reporting. The authors noted that voluntary CSR reporting was complementary to mandatory financial reporting and that both helped investors understand how current earnings charted future performance.

In an emerging market, Swarnapali (2019) found a positive relationship between sustainability reporting and earnings informativeness in companies listed in the Sri Lankan stock exchange during the period from 2012 to 2016. This relationship revealed that sustainability reports provide complementary information to financial reports, as well as help stakeholders to better interpret financial data. Finally, the author highlights that capital market participants were gradually becoming aware of the relevance of sustainability reporting.

The study conducted by Ng and Rezaee (2020) observed during the period from 2005 to 2015 that ESG performance, as well as its disclosure, was positively related to the informativeness of the stock price. They also identified that this relationship was intensified in those companies where the disclosure of ESG practices was higher.

From a sample of Canadian companies listed in the S&P/TSX Composite Index, Schiehll and Kolahgar (2021) conducted an automated content analysis on 150,000 documents from 1999 to 2014. The authors examined, based on the relevance of the information and the principle of financial materiality, whether ESG disclosure benefited the financial market by increasing stock price informativeness. The findings indicated that the disclosure of ESG information was relevant to investors and, further, that the financial materiality of this disclosure led to more informative stock prices. In addition, they found that the effect on informativeness, caused by ESG disclosure, differed between the pillars that make up this disclosure, being more sensitive in the social component.

In turn, the study by Zhang et al. (2021) explored the role of social media in the corporate sphere. The authors looked at how posts posted on online stock forums could affect the productivity of companies. To do so, they considered the informativeness of the stock price and the mechanisms of corporate governance. As a result, they identified that the posts made improved the productivity of the companies and that this effect varied based on the characteristics of the posts.

In Brazil, there are divergent results regarding the reaction of the capital market to information on ESG practices. Salgado et al. (2013) demonstrated that investments of a social and sustainability nature were negatively related to the economic and financial performance of companies listed in the CSI portfolio, during the period from 2005 to 2010. This result represents that, at least in the short term, socially responsible actions do not seem to create value for Brazilian organizations.

Freguete et al. (2015) showed that during periods of economic instability, more specifically during the 2008 crisis, Brazilian companies listed in the CSI portfolio did not present advantages in terms of economic and financial performance compared to non-listed companies. Martins et al. (2015) found that, when being part of CSI, companies demonstrated positive abnormal returns and, when excluded from the index, they presented negative abnormal returns. However, with the absorption of the inflow or outflow of CSI, the market resumed its normality.

Pereira et al. (2020) tested the nuances in the relationship between corporate social responsibility and financial performance, and investigated the moderating role of voluntary disclosure. As a sample, the authors considered the companies that were part of CSI in the period from 2010 to 2013. The findings demonstrated a positive and significant relationship in the two directions of causality considered; however, the disclosure of sustainability reports did not intensify this relationship.

Considering the context of negative environmental impacts, Prudêncio et al. (2020) analyzed the effects of negative environmental disclosure on the performance of companies that caused disasters or accidents. In this analysis, the authors considered two means of communication: GRI sustainability reports and information disseminated on social media. The results found indicated that negative environmental disclosure did not impact the operational performance of the companies analyzed; however, it influenced their market value.

Silva and Callado (2020) demonstrated that the fact that Brazilian companies are listed in the Global 100 ranking (a list that brings together

companies with the best performance in sustainability) did not have a significant impact on accumulated abnormal returns. Finally, Oliveira et al. (2021) investigated the impacts of the B3 sustainability index and the Covid-19 pandemic on the value, performance, and risk of Brazilian companies in the period from 2010 to 2020. The results indicated that adherence to the sustainability index significantly reduces the performance and risk of the companies analyzed and that the pandemic was a determining factor for the reduction of the value, accounting performance and volatility of these companies. With this, the study highlighted the positive influence that sustainable practices have on the market value of Brazilian companies.

Together, the studies carried out in the Brazilian context demonstrate that several factors can guide the different results of the ESG effect on the market, such as different proxies or analysis period. Regarding the analysis period, it is understood that due to the growing demand for ESG information, both from foreign investors (Forbes, 2020) and from stakeholders in the domestic market (InfoMoney, 2020b), Brazilian market participants may be gradually incorporating socially responsible behavior as synonymous with future benefits and this is a current issue.

In addition, in the Brazilian capital market, it is observed that a substantial number of companies have their stock listed in a foreign stock exchange, which reflects their exposure to the demand for information from an internationalized public. As demonstrated by Forbes (2020), European investors have valued organizational commitment to ESG practices. Accordingly, Brazilian companies end up engaging with such practices, as a way to disclose required and relevant information to the foreign market.

In addition, the results of international research are taken into account (Bona-Sánchez et al., 2017; Cheng & Wahid, 2017), also carried out in emerging markets (Swarnapali, 2019), in which the positive influence of ESG information on earnings informativeness was verified. More specifically, in the emerging market, Swarnapali (2019) highlighted that capital markets are gradually becoming aware of the relevance contained in ESG reporting. With this, the first hypothesis of this research was elaborated:

H1 – ESG disclosure is positively related to earnings informativeness.

In addition to testing the impact of ESG information on earnings informativeness, this research verifies the moderating role of social media in this relationship. Social media is perceived as a means capable of generating greater visibility to the socially responsible behavior of organizations. Therefore, it is expected to enhance the effect of ESG practices on earnings informational content.

In fact, the literature review carried out by Karuna (2019) on the capital market in accounting identified two future fields of research that are related to the theme of the present study. The author highlights the constant change in the business scenario, considering that the main organizational assets are the

intangible ones and that companies have been operating in increasingly volatile, uncertain, complex and ambiguous environments. Given this evolutionary scenario, it is argued that a broader view of the value of companies is gaining ground in the literature.

Lev and Gu (2016) had already highlighted this evolutionary scenario of companies, by stating that traditional financial reports would tend to lose their relevance by impacting the value of the company. According to the authors, only 5% of the information contained in financial statements is used by investors when making decisions. What the authors see is the trend of using reports in which a multi-stakeholder perspective is addressed, in order to meet the expectations of various parties related to the company.

As a future suggestion for studies on capital markets and accounting, Karuna (2019) highlighted the use of reports with non-financial information, which, for the author, can boost long-term growth in the value of the company. Moreover, Karuna (2019) highlights that investors are increasingly requesting non-financial information, as they use it to analyze the valuation prospects of companies, as well as sustainable growth from the perspective of different stakeholders.

In line with the previous view of Lev and Gu (2016), this first aspect highlighted by Karuna (2019) concerns what is treated in this research as non-financial ESG practices, which, according to both studies, has the potential to add value to companies. The second aspect addressed in the (2019) review performed by Karuna is about the use of social media, which can be an additional means of transmitting information about companies, in addition to financial reports.

According to Karuna (2019), companies can make use of social media to disseminate relevant information in a timely manner, which could influence the nature of stakeholder relationships and signal possible future scenarios. Empirically, Lee et al. (2015) demonstrated that the negative reaction of the stock price to product recall announcements is less evident in companies that have interactive social media, especially with regard to the use of Twitter and the number of tweets of the company.

In a Brazilian context, Giordani et al. (2020) demonstrated that the use of Twitter to publish financial information positively influences market performance, in terms of stock returns. The authors indicated that social media is an additional source of information for stakeholders and that it has an influence on market participants. In general, they point out that the market incorporates information disseminated on social media.

Linked to this, Giordani et al. (2019) found that organizational engagement in social media, such as, for example, Facebook and Twitter, was positively related to higher scores of social and environmental information. These authors demonstrated that the media could be considered facilitating channels for the low-cost and fast dissemination of non-financial information.

Based on these researches, the present study inserts social media in the discussion about the impact of ESG information on the earnings informativeness, treating the media as a potentiating aspect of this relationship. In other words, the premise is that companies that have an ESG reporting and that disclose ESG

information on social media tend to present more informative earnings. Social media would serve, in this context, as a more far-reaching channel to inform investors about socially responsible organizational commitment. Thus, the second research hypothesis is presented.

H2 – The relationship between ESG information and earnings informativeness is enhanced by disclosures on social media.

In the event that it is identified that the use of social media for the disclosure of ESG information enhances its relationship with the earnings informativeness, hypothesis H2 cannot be rejected. Accordingly, it would be possible to infer that social media play a relevant role for the Brazilian capital market by assisting in the dissemination of non-financial information at a low cost and, consequently, enabling the increase in the earnings informativeness of the companies analyzed.

3 METHODOLOGICAL PROCEDURES

3.1 Sample

The population of this research is composed of publicly-held companies listed in the Brasil, Bolsa e Balcão [B³] stock exchange in May 2021. In order to delineate the sample, observations of the period in which the companies did not contain information to calculate the variables and the companies in the financial sector were excluded. The sample totaled 723 observations of companies/year, analyzed during the period from 2015 to 2019.

Table 1 presents the research sample subdivided by economic sectors (Panel A) and between those that publish ESG information on social media and those that do not (Panel B). Both Information items are shown by year of analysis.

Table 1
Sample of companies by year and sector

Panel A – Sample by economic sectors classified by GICS							
Sector	2015	2016	2017	2018	2019	Obs.	%
Discretionary consumption	35	34	43	38	49	199	28%
Basic consumer goods	9	11	13	11	13	57	8%
Energy	6	6	6	7	7	32	4%
Real estate	9	11	12	12	12	56	8%
Industry	26	19	25	25	26	121	17%
Materials	15	17	17	14	11	74	10%
Healthcare	5	6	7	11	12	41	6%
Communication service	3	4	4	6	5	22	3%
Information technology	6	5	6	6	4	27	4%
Utilities	12	17	25	17	23	94	13%
Total	126	130	158	147	162	723	100%
Panel B – Sample of companies with social media							
Year		With Twitter		% Companies		Without Twitter	% Companies

2015	12	18,46%	114	17,33%
2016	13	20,00%	117	17,78%
2017	18	27,69%	140	21,28%
2018	8	13,85%	138	20,97%
2019	13	20,00%	149	22,64%
Total	65	100%	658	100%

Caption: GICS: Global Industry Classification Standard; Obs.: Observations.
Source: Designed by the authors.

According to Panel A of Table 1, it is noted that, regarding the sector of activity, the most representative in the sample include the sectors of Discretionary consumption (28%), Industry (17%) and Utilities (13%). In addition, according to Panel B, it is noted that the number of companies that use social media to disclose ESG information has fluctuated over the years, reaching 18 companies (27.69%) in 2017. However, this number was reduced by the end of the period analyzed, where only 13 companies (20%) that use Twitter as a way to disclose their ESG information were identified.

3.2 Research variables

Table 2 presents the variables that make up the research construct.

Table 2
Research construct

Variables	Description	Calculation	Authors
Dependent variable			
Earnings informativeness (EI)	It measures whether the stock market incorporates earnings information into the price formation process	Equation 1	Bona-Sánchez et al. (2016), Cheng e Wahid (2017), Swarnapali (2019)
Independent variable			
Environmental, Social, Governance (ESG)	It measures how engaged companies are in ESG practices	Refinitiv Eikon® database methodology, where more than 150 items related to ESG actions are analyzed and scored	Kaiser e Welters (2019)
Moderating variable			
Media (MID)	Tweets	Natural log of the total number of tweets	Jung et al. (2018), Giordani et al. (2019)
	Tweets regarding ESG information	Natural log of the total number of tweets regarding ESG information	Jung et al. (2018)
	Retweets	Natural log of the total number of retweets regarding ESG information	Jung et al. (2018)

Likes	Natural log of the number of likes regarding ESG information	Jung et al. (2018)
Comments	Natural log of the number of comments regarding ESG information	Jung et al. (2018)
Users who follow the company	Natural log of the number of users who follow the company	Jung et al. (2018), Giordani et al. (2019)
Users the company follows	Natural log of the number of users the company follows	Jung et al. (2018), Giordani et al. (2019)
Number of years the company has been using Twitter	Number of years the company has been using Twitter	Jung et al. (2018), Giordani et al. (2019)

Source: Designed by the authors.

In order to measure the earnings informativeness, this research was based on the studies of Bona-Sánchez et al. (2016), Cheng and Wahid (2017) and Swarnapali (2019). In the study by Swarnapali (2019), the equations that aim to determine the earnings informativeness are presented separately. Therefore, for didactic reasons, the equations of the aforementioned study were adopted:

Equation 1

$$CAR = \beta_0 + \beta_1 UE + \varepsilon$$

In this equation, CAR refers to cumulative abnormal return and represents the cumulative stock return adjusted for a thirty-day announcement window, calculated by the difference between the average return of each company over the average return of the portfolio of companies of the same size and book-to-market index (six portfolios were created, according to the research by Gao and Zhang (2015); UE refers to unexpected earnings and corresponds to the difference between current earnings and earnings projected by analysts (EPS_reported$_t$ – EPS_analyst$_t$), where EPS_reported$_t$ refers to the variable "Earnings Per Share Reported – Mean" and the variable EPS_analyst$_t$ refers to the variable "Earnings Per Share – Mean"; in turn, ε represents the term "error". It is expected that β1 is significant and positively related to the dependent variable, which would represent that the stock market incorporates earnings information in the price formation process.

Regarding the variable "ESG", the score provided by the Refinitiv Eikon® database was used, which measures on a scale of 0 to 100 the extent to which companies are engaged with the environment, society and governance. Previous studies used to support the hypotheses of this research measured this variable differently. Brazilian studies focused on evaluating, through an event study, the inclusion of companies in the CSI portfolio (Salgado et al., 2013; Martins et al., 2015;

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Freguete et al., 2015), in addition to the classification of the company in an index that lists the 100 most sustainable companies (Silva & Callado, 2020).

International studies, on the other hand, measured the responsible behavior of companies considering categorical variables that represented the disclosure or non-disclosure of a sustainability reporting. Studies have considered whether companies disclosed their information based on GRI guidelines (1) or not (0) (Bona-Sánchez et al., 2016; Cheng & Wahid, 2017), or whether they only released a sustainability report (1) or not (0), without considering any specific guideline.

Other studies, such as that by Kaiser and Welters (2019), used the indicator proposed by the Refinitiv Eikon® database to investigate the relationship between ESG practices and stock portfolios. In this study, as well as in that by Kaiser and Welters (2019), it is understood that the score generated by Refinitiv Eikon® provides consistent and internationally accepted evidence on the engagement of organizations in ESG. Therefore, the score provided by the database was used to measure ESG performance. Nonetheless, in this research, the score from 0 to 100 provided was divided by 10, as a way to bring it closer to the other variables (in descriptive statistics), being transformed into a categorical variable in the main operationalization (regressions), equal to 1 for companies with any ESG score and zero otherwise, in order to facilitate the interpretation of the moderations (equations 2 and 3).

As for social media acting as a moderating variable, Twitter was chosen. Studies point to it as one of the most used platforms by organizations (Jung et al., 2018; Manetti et al., 2017) and that enables the dissemination of information directly, for the time chosen by its users, as well as the sending of repeated and similar messages referring to the same information event. Moreover, it is possible to know the exact number of followers, so that companies are aware of the reach of their information (Jung et al., 2018).

In order to collect the information necessary for the calculation of the variable "media", the website of each company was initially checked, as a way to verify whether they had links that directed directly to their Twitter page. This process ensures that the corporate page, as well as the identified user, is the official one of the company at stake (Jung et al., 2018). Thus, the information contained in Table 1 was collected to prepare a score referring to the corporate use of Twitter for the disclosure of ESG information.

In order to prepare this score, these variables were used in the operationalization of the MOORA method (Multi-Objective Optimization based on Ratio Analysis). The MOORA method is characterized as a multi-criteria decision analysis tool, consisting of the evaluation of companies as a whole, calculated as follows: the data set is squared and then divided by the sum of the data presented squared as denominators. The indices used are situated between zero and one and added when the index aims for maximization, or subtracted when the goal is minimization (Brauers & Zavadskas, 2006). Accordingly, the higher the score generated, the greater the corporate use of Twitter for the dissemination of ESG information by the companies in the sample.

It should be noted that no explanatory variables were used for the abnormal return around the earning announcements, as performed by Gao and Zang (2015).

3.3 Operationalization

Regarding operationalization, ordinal least squares (OLS) modeling was used, controlling for the fixed effect of company, year and sector, in order to control concerns about possible biases of variables omitted. First, Equation 2 was operationalized, where the H1 of this research was empirically tested:

Equation 2

$$CAR = \beta_0 + \beta_1 UE + \beta_2 ESG_{it} + \boldsymbol{\beta_3 UE_{it} * ESG_{it}} + EfeitoFixo_{ano} + EfeitoFixo_{Setor} + \varepsilon_{it}$$

Here, β_3 is expected to be positive and statistically significant, which would reveal that ESG information is incorporated into stock prices. In order to test H2 of this research, the moderating effect of ESG information on social media is inserted into Equation 3, with a focus on verifying whether the media are capable of giving greater visibility to ESG practices, in such a way as to enhance their relationship with the cumulative return of shares.

Equation 3

$$CAR = \beta_0 + \beta_1 UE + \beta_2 ESG_{it} + \beta_3 MID_{it} + \beta_4 UE_{it} * ESG_{it} + \beta_5 UE_{it} * MID_{it} + \beta_6 ESG_{it} \\ * MID_{it} + \boldsymbol{\beta_7 UE_{it} * ESG_{it} * MID_{it}} + EfeitoFixo_{ano} + EfeitoFixo_{Setor} + \varepsilon_{it}$$

Here, β_7 is expected to be positive and statistically significant, which would reveal that ESG information, disclosed on social media, is incorporated into the stock price, in order to enhance the earnings informativeness.

The assumptions of the OLS regression were tested and the results are presented together with the tables containing the results. It is worth noting that the variable "UE" was normalized so that its interaction with ESG and media reflected the theoretical premise.

4 RESULTS ANALYSIS AND DISCUSSION

Table 3 contains the descriptive analysis of the variables. In Panel A, there is information regarding the total sample of this research; while, in Panels B and C, the t-tests of means for groups are demonstrated, in order to verify significant differences between companies that engage or do not engage in ESG practices (Panel B) and between companies that disclose or do not disclose ESG information on their social media (Panel C).

It is noted that Brazilian companies have, on average, a negative cumulative return on their shares, when adjusted for thirty days. Regarding ESG practices, the wide variability in the levels of engagement of companies stands out, since scores from zero were identified up to companies with 8.98 points (out of a total of 10), with a standard deviation of 2.54.

Table 3
Descriptive statistics

Panel A – Descriptive statistics of the total sample							
	Min	Pct 25	Median	Pct 75	Max	Mean	SD
CAR_{it}	-0.1984	0.0000	0.0000	0.0000	0.1909	-0.0015	0.0674
UE_{it}	-0.0134	0.0000	0.0000	0.0000	0.1325	0.0094	0.0212
ESG_{it}	0.0000	0.0000	0.0000	3.3900	8.9848	1.6765	2.5463
N				723			

Panel B – T-test of means for group with and without ESG information			
	With ESG	Without ESG	t
	Mean	Mean	
CAR_{it}	-0.0121	0.0048	3.2858***
UE_{it}	0.0167	0.0050	-7.4212***
N	270	453	

Panel C – T-test of means for group with and without disclosure on social media			
	With social media	Without social media	t
	Mean	Mean	
CAR_{it}	0.00260	-0.0019	-0.5143
UE_{it}	0.0133	0.0090	-1.5427
ESG_{it}	3.6422	1.4823	-6.7205
N	65	658	

Caption: *, **, *** significant at the 10%, 5% and 1% levels, respectively; continuous variables were winsorized at 1% and 99%; Min is the abbreviation for minimum; Pct is the abbreviation for percentile; Max is the abbreviation for maximum; N represents the number of observations; CAR is the cumulative stock return adjusted for a thirty-day announcement window; UE is the difference between current earnings and expected earnings; ESG is the acronym for Environmental, Social and Governance.
Source: Designed by the authors.

Regarding the t-tests of means shown in Table 3, it can be noted that, for the sample analyzed in Panel B, companies engaged in ESG have, on average, negative cumulative abnormal returns (CAR_{it}), while companies engaged in ESG have positive cumulative abnormal returns (CAR_{it}). Regarding unexpected earnings (UE_{it}), ESG companies appear to report earnings with greater differences from those predicted by analysts, when compared to non-ESG companies, where the earnings reported and predicted by analysts are more similar. Taken together, these results suggest that the negative cumulative returns of ESG companies may be due to the greater difference between the earning predicted by analysts and that reported by these companies.

In turn, the test carried out considering companies that have or do not have social media and use it to disclose ESG information (Panel C) did not present significant results, which may be due to the low number of companies that disclose ESG information on Twitter (only 65, compared to 658 that do not).

As a way to analyze the association between the variables, the Pearson/Spearman correlation matrix was designed, shown in Table 4.

Table 4
Pearson/Spearman correlation matrix

	CAR_{it}	UE_{it}	ESG_{it}	MID_{it}
CAR_{it}	1	-0.0207	-0.1081**	0.0058
UE_{it}	0.0072	1	0.3978**	0.1221**
ESG_{it}	-0.1215**	0.2664**	1	0.2109**
MID_{it}	0.0273	0.0480	0.2144**	1

Caption: Pearson on the lower diagonal and Spearman on the upper diagonal; **significant at the 5% level; continuous variables were winsorized at 1% and 99%; CAR is the cumulative stock return adjusted for a thirty-day announcement window; UE is the difference between current earnings and expected earnings; ESG is the acronym for Environmental, Social and Governance; ESG is a categorical variable equal to 1 if the company has any ESG engagement score and 0 if the company has no score of zero.
Source: Designed by the authors.

The analysis of Table 4 indicates, preliminarily, that unexpected earnings (UE_{it}), as well as media disclosure (MID_{it}) of the organizations analyzed do not correlate significantly with the cumulative abnormal return of the stock (CAR_{it}). Nonetheless, there is a positive and significant correlation between engagement in ESG practices (ESG_{it}) and their disclosure on social media, as well as between ESG_{it} and unexpected earnings (UE_{it}) of Brazilian companies, which means that companies involved in ESG are those that make the greatest disclosure on social media, as highlighted by Giordani et al. (2019), and those that report earnings that are more different from those predicted by analysts.

Table 5 presents the models that aim to analyze the relationship between earnings informativeness and ESG. Column 1 presents equation 1 of research, with fixed effects controls by sector and year. In column 2, the ESG variable is included in the equation, and in column 3, the interaction variable.

Table 5
Results of the relationship between ESG and earnings informativeness

	CAR_{it} (1)	CAR_{it} (2)	CAR_{it} (3)
$\beta_1 UE_{it}$	0.0680	0.1729	0.2631
	(0.41)	(0.99)	(1.07)
$\beta_2 ESG_{it}$		-0.0178***	-0.0164***
		(-3.23)	(-2.73)
$\beta_3 UE_{it}*ESG_{it}$			-0.1483
			(-0.43)
β_0	0.0014	0,0081	0.0076
	(0.20)	(0,96)	(0.91)
FE Year	Yes	Yes	Yes
FE Sector	Yes	Yes	Yes
ANOVA	0.0035***	0.0019***	0.0022***
R^2	3.91%	5.36%	5.41%

VIF	1.03	1.13	3.31
DW	2.0838	2.0953	2.0959
N	723	723	723

Caption: *, **, *** significant at the 10%, 5% and 1% levels, respectively; continuous variables were winsorized at 1% and 99%; CAR is the cumulative stock return adjusted for a thirty-day announcement window; UE is the difference between current earnings and expected earnings; ESG is the acronym for Environmental, Social and Governance; ESG is a categorical variable equal to 1 if the company has any ESG engagement score and 0 if the company has no score of zero; N represents the number of observations; FE is the acronym for fixed effect; VIF is the variance inflator factor; DW is the acronym for Durbin Watson; the standard error was clustered by company.
Source: Designed by the authors.

The findings in Table 5 indicate, first, that unexpected earnings (β1UEit) are not informative by themselves in the Brazilian context (column 1), so that the stock market does not incorporate their information into the price formation process. This occurs because β1 in the equation did not present a statistically significant relationship with the cumulative abnormal return (CARit). Moreover, the negative coefficient of the variable "ESG" (β2ESGit), in columns 2 and 3, demonstrates that ESG companies have lower cumulative abnormal returns, which corroborates the results shown in Panel B of Table 3.

Regarding the interaction between the variable "ESG" and the unexpected earnings (β3UEit*ESGit), in column 3, it is clear that the difference between the earning reported by the company and the earning predicted by analysts is not incorporated into the cumulative abnormal return in ESG companies, which differs from what is expected by H1 of this research and, therefore, justifies its rejection.

These results, although divergent from what was expected, can be understood based on the arguments of Cheng and Wahid (2017), who point out that in fact, the ability of ESG to enhance the earnings informativeness is an entirely empirical issue. The first argument that explains why ESG information is not informative in a given context is linked to the extensive amount of information disclosed by companies, which can generate a significant cost for investors and analysts to observe and incorporate such information.

In addition, Cheng and Wahid (2017) highlight that the lack of comparability between ESG reports of companies can also hinder their informative potential. This lack of comparability is also present in the Brazilian context, where each company discloses its information in a particular way, which can end up making it difficult for market agents to understand its informative potential.

Finally, Cheng and Wahid (2017) also highlight that a skeptical view of ESG practices may justify their lack of informativeness. Investors may understand that companies engage in ESG practices only as a way to cover up other opportunistic practices that occur in the organization, the so-called "green curtain", which highlights "good" information as a way not to draw the attention of information users to potentially "bad" information. If investors consider that Brazilian companies may use this "greenwashing" or "socialwashing" practice, in fact, their ESG information will not reflect in the greater informativeness of their earnings.

Table 6 presents the results of the influence of ESG information disclosed on social media on earnings informativeness. Column 1 analyzes only the influence of

the media on the cumulative abnormal return of shares, without considering its moderating role. Column 2 analyzes the results of equation 3, which aim to identify the interaction among UE, ESG and the media.

Table 6
Results of the influence of ESG information disclosed on social media on earnings informativeness

	CAR_{it}	CAR_{it}
	OLS	OLS
	(1)	(2)
$\beta_1 UE_{it}$	0.0630	0.2376
	(0.36)	(0.97)
$\beta_2 ESG_{it}$		-0.0185***
		(-3.06)
$\beta_3 MID_{it}$	0.0362	0.0410
	(1.36)	(1.31)
$\beta_4 UE_{it}*ESG_{it}$		-0.1408
		(-0.39)
$\beta_5 UE_{it}*MID_{it}$		4.8716***
		(4.36)
$\beta_6 UE_{it}*ESG_{it}*MID_{it}$		-4.2474***
		(-3.16)
β_0	-0.0001	0.0060
	(-0.02)	(0.68)
FE Year	Yes	Yes
EF Sector	Yes	Yes
ANOVA	0.0042***	0.0000***
R^2	0.0423	0.0629
VIF	1.08	17.83
DW	2.0928	2.1024
N	723	723

Caption: *, **, *** significant at the 10%, 5% and 1% levels, respectively; continuous variables were winsorized at 1% and 99%; CAR is the cumulative stock return adjusted for a thirty-day announcement window; UE is the difference between current earnings and expected earnings; ESG is the acronym for Environmental, Social and Governance; ESG is a categorical variable equal to 1 if the company has any ESG engagement score and 0 if the company has no score of zero; N represents the number of observations; FE is the acronym for fixed effect; VIF is variance inflator factor; DW is the acronym for Durbin Watson; the standard error was clustered by company.
Source: Designed by the authors.

The findings in column 1 demonstrate that corporate use of Twitter does not impact the cumulative abnormal return of shares (β3MIDit). Nevertheless, in column 2, when interacting corporate use of Twitter with unexpected earning (β5UEit*MIDit), it is observed that the earning reported by companies that differs from that expected by analysts is informative for those companies that use Twitter.

This result reflects the informative potential of social media and corroborates the results of Giordani et al. (2020), when demonstrating that there is an enhancement of the informativeness of unexpected earning in the Brazilian context by the use of Twitter, since the interaction $\beta5UEit*MIDit$ was significant at the 1% level.

Nonetheless, when observing the moderating effect of the media on the relationship between ESG information and earnings informativeness ($\beta6UEit*ESGit*MIDit$), a negative and significant relationship is identified at the 1% level. This means that the ESG performance of Brazilian companies removes the positive effect that corporate use of the media has on earnings informativeness.

Although the disclosure of ESG information on Twitter is linked to greater earnings informativeness ($\beta5UEit*MIDit = 4.87^{***}$), the results show that this disclosure is not sufficient to overcome the negative effects that may be perceived by companies that have an ESG score provided by Refinitiv Eikon® ($\beta6UEit*ESGit*MIDit = -4,25^{***}$). Accordingly, one can see that Twitter can be a key channel for the disclosure and clarification of ESG information, since, when disclosed on other channels that do not require greater public engagement (such as the score provided by Refinitiv), they may be perceived as negative practices for the market and not informative about earnings.

It is also perceived that of the 723 observations analyzed, only 270 refer to companies that have an ESG score disclosed by the Refinitiv Eikon® database, in addition to the fact that only 65 observations refer to companies that disclose ESG information on Twitter. What may justify the fact that Twitter is informative in these 65 observations ($\beta5UEit*MIDit = 4.87^{***}$) is that, most likely, this information disclosed on social media will explain/clarify/justify the possible reasons why the earning reported by the company was different from the earning predicted by analysts. Accordingly, the disclosure of ESG information on this social media channel can be considered informative, although the ESG score disclosed by Refinitiv Eikon® is not.

5 FINAL CONSIDERATIONS

This research evaluated the effect of ESG information disclosed on social media on the earnings informativeness. To this end, a survey was conducted with 723 company-year observations of Brazilian companies listed in B3, analyzed from 2015 to 2019. The findings indicate that, in the Brazilian context, companies with higher levels of engagement in ESG practices have no effect on the informativeness of unexpected earnings. Accordingly, based on the analyses performed, the premise elaborated in hypothesis H1 of the study was rejected.

Regarding corporate use of social media, the results show that companies are more informative when using this channel to disclose their socially responsible practices. Conversely, higher levels of engagement in ESG practices seem to cancel out the positive effects provided by the use of the media. Therefore, it is concluded that companies that have ESG reports and disclose such information on social media do not present more informative earnings. Accordingly, hypothesis H2 could not be accepted.

This study contributes to the literature by emphasizing that, in the Brazilian context, unexpected earnings are not informative in themselves, since there is no incorporation of their information by the stock market in the price formation process. Moreover, it is noted that, unlike other contexts, the ESG performance of companies is not perceived by market participants as a complementary disclosure to financial reports.

As for the findings related to social media, the study contributes by demonstrating that information related to ESG practices in the context analyzed, and signaled through social media, such as, for example, Twitter, can increase the visibility of such information and, therefore, influence the perception of investors and analysts, thus maximizing the informativeness of their earnings.

The present study has some limitations, among which two main ones can be highlighted. First, the use of data provided by the Refinitiv Eikon® database as a way to measure the ESG performance of companies, since there is the possibility that companies are engaged in ESG practices, but such practices are not captured by the database.

Finally, this research is limited to the analysis of only one social media (Twitter), which is why future research may include other media, such as, for example, Facebook, in order to increase the period of analysis of the information considered and the number of companies that use the media. Regarding social media, it is also recommended to carry out a qualitative analysis of the information disclosed by the organizations, so that it is possible to identify if there are differences in the effect of this information, depending on the content disclosed.

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