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CEOs' Use of Social Media and Earnings Management

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Abstract

Objective: To analyze the relationship between CEOs' use of LinkedIn to disclose corporate information and the practice of earnings management.

Method: A survey was conducted with Brazilian companies integrating the IBrX100. Ordinary Least Squares regressions were performed, and the analysis period corresponded to the length of CEOs' working in the company.

Results: The findings showed a positive relationship between the CEOs' use of LinkedIn and the practice of earnings management through accruals. However, this relationship was not identified for earnings management through real activities. The sensitivity test indicated that CEOs' use of LinkedIn is positively related to AEM practices – both to increase and to reduce the profits of the companies addressed here.

Contributions: This study identifies that social media can mask management practices to reduce the quality of accounting information, corroborating the opacity hypothesis. This hypothesis predicts that reputable and more powerful CEOs are negatively associated with earnings quality. In addition, it contributes by showing that the corporate use of social media can go beyond the disclosure of information to affect the quality of accounting information.

Keywords: Social Media; LinkedIn; CEO; Results Management.

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Introduction

This study investigates whether CEOs using social media to disclose corporate information is related to decision-making about earnings management practices. CEOs are the prominent corporate leaders responsible for a large part of organizational decision-making, including earnings management practices, which may distort financial accounting information in the capital market (Wu et al., 2016). The role of social media goes beyond the mere dissemination of news, as they allow financial market participants to interact; hence, social media is a promising communication tool (Miller & Skinner, 2015).

In this sense, studies have related the corporate use of social media platforms to disclose financial results and their effects on companies. Evidence indicates that the corporate use of social media improves trading volume, enables greater liquidity and performance (Blankespoor et al., 2018), influences the investors' decision-making (Arnaboldi et al., 2017), enables direct communication with stakeholders (Chahine & Malhotra, 2018), and reaches a broader audience, causing more significant impact on the market (Jung et al., 2018; Teoh, 2018).

In addition to companies using social media, managers also adopt these platforms for corporate disclosure (Capriotti & Ruesja, 2018). CEOs communicating through their personal accounts may facilitate the dissemination of organizational information and interaction with the company's stakeholders (Huang & Yeo, 2018). CEOs who are corporately active on social media may be perceived as more friendly and attentive (Bai et al., 2019) and are likely to create social bonds with other users interested in the company (Elliott et al., 2018), e.g., shareholders, investors, and analysts. Thus, they build a reputation in these media with the stakeholders of the organizations in which they operate. This study focuses on the CEOs' use of social media. It seeks to contribute to the literature by investigating the effects of such communication on the quality of profits, specifically through earnings management practices.

According to Dechow et al. (2010), the higher the quality of profits, the more relevant the information on financial performance characteristics for decision-making. Therefore, the quality of reported earnings is associated with decision-makers' motivations (Shiah-Hou, 2021). CEOs are responsible for corporate results and decisions that affect shareholders and other stakeholders (Alkebsee et al., 2021). Some studies have shown that more powerful CEOs are more likely to make corporate decisions for personal benefit (Baldenius et al., 2014; Abernethy et al., 2015; Lisic et al., 2016), as may be the case of earnings management practices.

Two hypotheses are highlighted regarding CEOs' power: that concerning opacity and the one concerning transparency. The first indicates that more powerful CEOs tend to more frequently manage results and produce a dark environment (Shleifer & Vishny, 1989; Stoughton & Talmor, 1999; Aboody & Lev, 2000), while the second favors a more transparent environment, as a powerful CEO is not concerned with hiding any unexpected results (Bartov & Mohanram, 2004; Abernethy et al., 2015; James et al., 2017). In addition to greater power, a CEO's reputation may also be decisive for accounting practices and favor the hypothesis of opacity/transparency; a CEO's attitude during his/her tenure may affect his/her reputation in the market. A CEO's reputation is considered the totality of lasting and important images for stakeholders based on the CEO's perceived performance, ability, and values (Francis et al., 2008). Considering the literature addressing the CEOs' increased corporate use of social media (Capriotti & Ruesja, 2018) to disseminate organizational information related to their management (Huang & Yeo, 2018), we infer that this behavior may be a way for these managers to build and maintain their reputation in the market. Thus, the premise is that the greater the use of media such as LinkedIn, the greater a CEO's reputation in the financial market.

Therefore, CEOs with a highly favorable reputation may use social media to communicate that they are approachable, more attentive, and friendly to mask accounting practices that reduce the quality of earnings, which is consistent with the opacity hypothesis. Such a hypothesis leads to the assumption of a negative relationship between CEOs' use of social media and earnings quality. In such a scenario, a CEO with a highly favorable reputation is likely to use social media to maintain his/her existing reputation with his/her company's stakeholders in the face of practices that reduce the quality of accounting information.

On the contrary, CEOs with good reputations may also use social media to communicate and maintain a direct relationship with their companies' stakeholders, providing a new source of information to investors, reducing information asymmetry, and maximizing earnings quality, which is under the transparency hypothesis. In this case, CEOs with a highly favorable reputation do not see the need to mask their practices because they use social media to disseminate good management practices aimed at earning quality and greater transparency.

In this sense, this study is intended to expand the literature on social media and earnings quality by addressing the relationship between CEOs' disclosure of information on their personal social media accounts and accounting practice decisions concerning earnings management. Specifically, we assess the presence and interactions of CEOs on LinkedIn to verify whether the CEOs' communication and engagement create a positive image for those interested in the organization. In this case, such an image can be used to mask earnings management practices to present more satisfactory results to stakeholders. On the other hand, it may also promote a more transparent environment through a new data source. Thus, the following research question is presented: **What is the relationship between CEOs' use of social media and the practice of earnings management?** Thus, the objective is to analyze the relationship between CEOs' use of LinkedIn social media to disclose corporate information and earnings management practices.

The use of social media has become frequent, both among individuals and in the corporate environment. Thus, the importance of studies aiming to verify how the use of these tools reflects on the capital market (Arnaboldi et al., 2017; Jung et al., 2018; Teoh, 2018) and, consequently, in the quality of profits is evident. Hence, this study's relevance is that it addresses a factor seldom explored in the literature but may affect the quality of accounting information, characterized by CEOs' use of LinkedIn to disclose corporate information.

In general, the literature addressing the use of social media in the corporate environment has focused on companies' disclosure. By examining disclosures from a CEO's perspective, this study contributes with an analysis of the role of another actor involved in the corporate use of social media, who can play a complementary role in a company's disclosure. Regarding earnings management, this study mainly contributes to those interested in organizations by seeking evidence on CEOs' behavior on social media and its relationship with earnings management practices.

2 Literature Review and Hypothesis Development

Social media are increasingly being used in the corporate environment. Empirical evidence shows the potential benefits for companies as a result of using these tools (Blankespoor et al., 2018; Chahine & Malhotra, 2018; Zhang, 2015), which are linked to the technological nature, real-time communication, low cost, and the possibility of interaction. The characteristics of social media have attracted more and more users; among them, CEOs, who can strategically use it to gain an advantage, such as disclosing corporate information, directly communicating with their followers, and increasing their visibility. Together, these factors may contribute to a CEO's image and build his/her reputation.

CEOs play an essential role, as they are responsible for the decision-making process in their companies, including decision-making concerning earnings management practices. Such practices reflect on the quality of profits and, consequently, influence the decision-making of other market agents (Wu et al., 2016). The literature presents evidence regarding the relationship between traditional media coverage and earnings management.

Conceptually, Comiran et al. (2018) discuss that media coverage can affect a company's incentives for earnings management in two ways. First, the media can play a vigilante role (Miller, 2006; Kuhnen & Niessen, 2012; Dai et al., 2015), and second, the effect of media coverage may be an incentive for higher levels of earnings management, due to the companies' greater visibility and, consequently, the intention or need to report higher profits (Dyck & Zingales, 2002; Scharand & Zechman, 2012; Hribar & Yang, 2016).

This study analyzes social media, which, unlike traditional media, has no intermediaries – that is, the person responsible for publications is the user himself/herself. In this environment, CEOs can build a direct relationship with a company's stakeholders and establish a good (or bad) reputation in the market. Additionally, they may act opportunistically to mask practices and manipulate users or create a more transparent environment to communicate with their companies' stakeholders.

Earnings management concerns the incorrect representation of managers about a company's performance in its financial reports to change accounting numbers that are the basis of reported results (Healy & Wahlen, 1999). This practice can occur in two ways: through real activities or discretionary accruals (Graham et al., 2005; Roychowdhury, 2006; Zang, 2007). The first involves intentional operational practices, such as cutting or increasing discretionary expenses increasing production or sales through abnormal discounts, among others (Roychowdhury, 2006). Earning management by discretionary accruals occurs from accounting choices linked to accruals arising from the accrual basis (Richardson et al., 2004).

Studies indicate that CEOs personify the organization and act as high-level corporate spokespersons, with the responsibility of communicating the vision of their organizations (Park & Berger, 2004; Ranft et al., 2006). Ranft et al. (2006) consider that a successful CEO not only increases public identification with his/her organization but is also capable of creating a favorable corporate reputation and establishing positive relationships with stakeholders, contributing to the company's results.

In addition, evidence shows that CEOs' presence and engagement in social media is a sign of innovation and can improve the reputation of companies (Weber Shandwick, 2012). Therefore, Weber Shandwick (2012) argues that "social CEOs," i.e., those with a well-established reputation in social media, can involve their stakeholders in genuine conversations and represent a new type of corporate leader.

Men and Tsai (2016) sought to understand the importance of this involvement by exploring how and why audiences engage with corporate CEOs on social media. Their findings indicate that CEO engagement with the public positively and significantly affected the perceived CEO's authenticity and accessibility. Such characteristics positively influence the confidence and satisfaction levels of the audience interacting with them through the media. The authors also found that CEOs public engagement on social media directly influenced the quality of relationships between organizations and their audiences.

Additionally, findings show empowerment as one of the factors explaining the CEOs' engagement in social media (Boyd, 2008; Tsai & Men, 2013), as the use of social media enables them to exert influence and impose excellence on a particular audience (Wang & Fesenmaier, 2003). Thus, this study considers the corporate use of social media to empower CEOs and, consequently, build their reputation with their stakeholders.

Studies relating CEOs' role and earnings quality identify two hypotheses. The first, opacity, suggests that more powerful CEOs are incentivized to seek personal benefit (Shleifer & Vishny, 1989; Stoughton & Talmor, 1999; Aboody & Lev, 2000). Thus, CEOs would make the information environment less transparent and with more significant information asymmetry (Bartov & Mohanram, 2004; Abernethy et al., 2015; James et al., 2017). The opacity hypothesis, therefore, predicts that more powerful CEOs would be negatively associated with earnings quality (Shiah-Hou, 2021).

The second hypothesis, that of transparency, suggests that more powerful CEOs are not concerned with masking information about their behavior, as they believe that they will not be replaced by less powerful CEOs (Stein, 2003). Therefore, they have less incentive to hide unsatisfactory performance in order to present greater information transparency (Zhao & Chen, 2008; Armstrong et al., 2012; Jiraporn et al., 2014). Thus, the transparency hypothesis predicts that CEOs' practices minimize information asymmetry and enable higher earnings quality (Shiah-Hou, 2021).

Evidence links CEOs' power with the opacity and transparency hypotheses through three sources: structural, property, and expert power (Shiah-Hou, 2021). Within this study's scope, we consider that similar to more powerful CEOs, those with good reputations may also act according to the opacity or transparency hypothesis. Specifically, the relationship between CEOs' reputation and earnings quality may be motivated by three aspects: 1) the users of financial statements consider CEOs' reputation a key factor for the quality of financial reports (Francis et al., 2008); 2) a CEO's concern with his/her career influences decisions regarding accounting practices disclosed in financial reports (Graham et al., 2005); and 3) highly reputable managers use accounting practices, such as earnings management, to maintain their reputation for delivering profits to the market (Malmendier & Tate, 2009).

In light of the above, there is one explanation for the relationship between a CEO's reputation and earnings quality, suggesting that the more favorable a CEO's reputation, the less likely s/he will be to take actions that result in poor financial reporting. Furthermore, the CEO's reputation is tied to the company's reputation, and in this sense, companies with good earnings quality are associated with lower capital costs. Hence, given the previous discussion, CEOs with a better reputation would opt for better accounting criteria to report better earnings quality (Francis et al., 2008; Graham et al., 2005), consistent with the transparency hypothesis.

However, a CEO's reputation may also be related to lower earnings quality. For Malmendier and Tate (2009), a consequence of CEOs' good reputation is that investors and analysts expect an increase in the company's future performance. Such a fact may lead CEOs to decide on lower-quality accounting practices, mainly when the results expected by the company's stakeholders are not achieved. In this case, the CEO's behavior would confirm the opacity hypothesis.

CEOs are generally believed to have incentives to make accounting choices, and they may provide information with lower or higher earnings quality depending on their intentions and how other market agents see them.

Thus, CEOs' use of social media enables them to be perceived as friendlier, more attentive, and have a more favorable reputation, allowing them to establish relationships with their companies' stakeholders. Therefore, social media interaction is believed to reveal the CEOs' intentions concerning accounting practices. Hence, this strategy enables the increase or decrease of the quality of earnings through earnings management by accruals and/or by real activities, either confirming the hypothesis of opacity or transparency. Hence, the following research hypothesis is proposed based on the literature discussed thus far. The sign of this relationship is not predicted, which may be associated with the opacity or transparency hypothesis:

H1: The CEOs use of LinkedIn to disclose corporate information is significantly related to the practice of earnings management.

3. Methodological Procedures

This study's population comprises Brazilian publicly-held companies integrating the Brazil Index or IBrX100. This index was chosen because it lists the 100 most tradable and representative assets in the Brazilian stock market (Brasil, Bolsa, Balcão, 2021). Companies from the financial sector were excluded, given the sector's specific characteristics and differentiated accounting standards. Additionally, companies with two assets in the Brazil Index remained with only one, excluding repeated data. Finally, the sample consisted of companies that presented data for calculating the variables used in the earnings management models.

First, we verified whether the CEOs of the respective companies displayed profiles on LinkedIn and whether they published information about their companies in their personal account. LinkedIn was chosen because the initial survey showed that 53% of the CEOs of the companies in the IBrX100 had an active account on this social media; participation on Twitter was just 9%.

Next, data were collected by applying filters with keywords related to the organization in which each CEO worked. The words searched concern the companies' information, such as name, profit, performance, growth, result, merger, acquisition, and incorporation.

The analysis period for each company ranges from 1 to 10 years, depending on the length of time the last CEO worked in the company, according to the survey conducted in January 2021. Data were analyzed per year. Table 1 presents the population and study's sample.

Table 1
Population and Sample

Items	Population	Sample
Companies	100	87
CEOs with a LinkedIn account	53	46
CEOs publishing corporate information on LinkedIn	48	43
Number of Followers on LinkedIn	1,438,204	652,515
Number of Publications on LinkedIn	1,575	1,358
Number of Likes on LinkedIn posts	1,043,881	847,467
Number of comments on LinkedIn Posts	39,583	34,569

Source: study's data.

Note that 87 companies were analyzed; a zero score was assigned to social media variables in companies whose CEOs did not have a LinkedIn profile. As shown in Table 1, approximately half of the companies in the sample (43) had a CEO with an active LinkedIn profile publishing corporate information on this social media. Among the analyzed social media variables, the number of followers stands out; on average, each CEO on LinkedIn had more than 15,000 followers. The number of followers justifies the high number of likes and comments shown in Table 1.

Next, Table 2 presents the variables used in the study, their descriptions, how they were collected, and their respective sources.

Table 2
Variables used in the study

Type of variable	Accruals	Description	Collection	Source
Dependent Variables				
Earnings Management by Accruals	AEM	Discretionary accruals operationalized in absolute value	*Refinitiv*®	Pae (2005)
Earnings Management by Actual Activities	REM	Abnormal cash flow, abnormal production costs, and abnormal discretionary expenses		Roychowdhury (2006)
Independent Variables				
Followers	SEG	Logarithm of the number of CEO's followers on LinkedIn	LinkedIn	Elaboradas pelos autores
Posts	PUB	Logarithm of the number of posts concerning the CEO's company on LinkedIn		
Likes	CUR	Logarithm of the number of likes on posts related to the CEO's company on LinkedIn		
Comments	COM	Logarithm of the number of comments on posts related to the CEO's company on LinkedIn		
Control Variables				
Market-to-book	MTB	Company market value divided by book value	*Refinitiv*®	Comiram et al. (2018)
Company's size	TAM	Natural logarithm of total assets at the end of period *t*		

Source: study's data.

The earnings management by accruals (AEM) model corresponds to that of Pae (2005), which aims to increase the predictive power of the Jones Model (1991) and Modified Jones models (Dechow et al., 1995), by including variables that show the operating cash flow and accrual reversal, according to Equation 1.

$$TA_{it} = \alpha + \beta_1 1/Ativo_{i,t-1} + \beta_2 \Delta REC_{i,t} + \beta_3 IMOB_{i,t} + \beta_4 FCO_{i,t} + \beta_5 FCO_{i,t-1} + \beta_6 TA_{i,t-1} \varepsilon_{i,t}$$

Equation 1

where:
TA_{it} = Total Accruals, measured by the variation in working capital, scaled by the total assets in *t-1* of company *i* in period *t1;*
Ativo = Total assets of company *i* in period *t-1*;
$\Delta REC_{i,t}$ = Variation in revenue of company *i* in period *t,* scaled by ;
$IMOB_{i,t}$ = is the gross fixed assets scaled by ;
$FCO_{i,t}$ = operating cash flow of company *i* in period *t,* scaled by ;
$FCO_{i,t-1}$ = operational cash flow of company *i* in period *t-1*, scaled by ;
$TA_{i,t-1}$ = Total accruals, measured by variation in working capital, scaled by total assets in *t-1;*
$\varepsilon_{i,t}$: is the error of the regression o (proxy for earnings management by discretionary accruals).

The model by Roychowdhury (2006) was used for the earnings management model based on real activities (REM). Thus, REM was estimated using operating cash flow, sales, general and administrative expenses, and production level, as shown in Equations 2, 3, and 4.

$$\frac{CFO_{it}}{Ativo_{i,t-1}} = \alpha + K_1 \frac{1}{Ativo_{i,t-1}} + K_2 \frac{REC_{i,t}}{Ativo_{i,t-1}} + K_3 \frac{\Delta REC_{i,t}}{\Delta\, Ativo_{i,t-1}} + \varepsilon_{it}$$

Equation 2

where:
CFO_{it} = Operating Cash Flow of company *i* in period *t*;
$Ativo_{i,t-1}$ = Total assets of company *i* in period *t-1*;
$REC_{i,t}$ = Sales of company *i* in period *t*;
$\Delta REC_{i,t}$ = Variation in sales of company *i* in period *t-1* for period *t*;
ε_{it} = regression error (proxy for earnings management by operating cash flow).

$$\frac{PROD_{it}}{Ativo_{i,t-1}} = \alpha + K_1 \frac{1}{Ativo_{i,t-1}} + K_2 \frac{REC_{i,t}}{Ativo_{i,t-1}} + K_3 \frac{\Delta REC_{i,t}}{\Delta\, Ativo_{i,t-1}} + K_3 \frac{\Delta REC_{i,t}}{\Delta\, Ativo_{i,t-1}} + \varepsilon_{it}$$

Equation 3

where:
$PROD_{it}$ = Costs of goods sold plus the variation in the inventories of company *i* in period *t*;
ε_{it} = regression error (proxy for earnings management by production costs).

$$\frac{DD_{it}}{Ativo_{i,t-1}} = \alpha + K_1 \frac{1}{Ativo_{i,t-1}} + K_2 \frac{REC_{i,t}}{Ativo_{i,t-1}} + \varepsilon_{it}$$

Equation 4

where:
DD_{it} = Discretionary expenses corresponding to the sum of advertising, research and development, sales, and general and administrative expenses of company *i* in period *t*;
ε_{it} = regression error (proxy for earnings management by discretionary expenses).

The three measurements of earnings management by real activities were combined into an aggregated metric, according to Comiram et al. (2018), to identify the overall effect of this management practice. The REM metric corresponds to *REM1 = – Ab_DD + Ab_PROD – Ab_CFO.*

Note that the earnings management by accruals models and real activities were operationalized by year and sector for all companies in Brasil, Bolsa, Balcão (B3) from 2011 to 2020. Next, the earnings management results from the companies composing the sample were separated considering the length in which the last CEO worked in the company.

Regarding the market-to-book (MTB) control variable, companies with a higher market value are more likely to have more public information about their financial position. However, the managers of companies with higher market value may also have more incentives for earnings management. Thus, the relationship between MTB and earnings management can be positive or negative.

As for the company's size control variable (TAM), a negative relationship with earnings management is expected. Such a negative relationship is based on the fact that larger companies have fewer incentives to manipulate results due to political costs (Gu et al., 2005).

The variables were first Winsorized at the 1% level for data analysis. Additionally, the logarithm was used for LinkedIn's social media variables for standardization purposes; thus, variables PUB, CUR, COM, and SEG correspond to the logarithm of the number of posts, likes, comments, and followers, respectively. Regarding earnings management, the absolute value of discretionary accruals was used, as the objective was to test the relationship between the CEOs' use of social media and earnings management, regardless of whether this factor influenced an increase or decrease in profits. Additionally, discretionary accruals were separated into positive and negative as an additional test.

The Shapiro-Wilk normality test showed that the residuals did not present a normal distribution ($Z = 6.51$; $p<0.000$). Next, Pearson and Spearman correlations were applied. Finally, OLS (Ordinary Least Squares) regressions with robust standard errors (with White correction) and sector fixed effect control were performed using the STATA software to meet this study's objective. Equation 5 corresponds to this study's model.

$$GR_{it} = \alpha + \beta_1 PUB_{i,t} + \beta_2 CUR_{i,t} + \beta_3 COM_{i,t} + \beta_4 SEG_{i,t} + \beta_5 MTB_{i,t} + \beta_6 TAM_{i,t} + efeito\_fixo\_setor + \varepsilon_{i,t}$$

Equation 3

Note that the GR corresponds to the earnings management models, by accruals and real activities. The variables of interest are those of social media, which correspond to PUB, CUR, COM, and SEG. Furthermore, MTB and TAM, control variables, correspond to market-to-book and size. Regressions were performed with and without control variables to test the direct relationship between the variables of interest and the dependent variable. Additionally, separate regressions were performed for each social media variable, because, if analyzed together, they would present a multicollinearity problem.

Robust regression was performed because the White test was significant ($P = 27.91$; $p<0.000$), indicating the presence of heteroscedasticity. Despite the residuals' non-normality, this assumption of the OLS linear regression was relaxed when considering the Central Limit Theorem due to the number of observations. Additionally, the multicollinearity between the variables was tested using the Variance Inflation Factor (VIF) test, and the autocorrelation of the residuals was tested using the Durbin-Watson test, the results of which are presented in the results analysis section.

4. Results Analysis and Presentation

First, we present the descriptive statistics of the variables used in this study. Next, the Pearson and Spearman correlation matrix and the regressions' results intended to meet this study's objective are presented.

The variables used to calculate earnings management and the control variables, market-to-book and company size, were Winsorized to 1%. The logarithm was used for the independent variables, followers, posts, likes, and comments for standardization purposes. Table 3 presents the variables' descriptive statistics, which comprises the mean, standard deviation, 25th percentile, median and 75th percentile.

Table 3
Descriptive Statistics

Panel A –Total Sample					
Variable	**Mean**	**Standard deviation**	**Percentile 25th**	**Median**	**Percentile 75th**
Total Sample					
AEM	0.031	0.025	0.008	0.025	0.048
REM	0.198	0.260	0.041	0.110	0.242
MTB	3.270	2.737	1.325	2.373	4.317
TAM	23.345	1.432	22.589	23.326	24.286
Panel B – Companies with CEOs with a LinkedIn account					
Variable	**Mean**	**Standard deviation**	**Percentile 25th**	**Median**	**Percentile 75th**
SEG	12487.95	11846.01	3241.00	9956.00	17604.00
PUB	12.12	26.24	0	1	13
CUR	6656.27	17907.05	0	25	3733
COM	278.51	706.06	0	0	170

Legend: AEM = Earnings management by Accruals; REM = Earnings management by Actual Activities; SEG = Logarithm of the number of followers on LinkedIn; PUB = Number of posts on LinkedIn; CUR = Number of likes on LinkedIn; COM = Number of comments on LinkedIn; MTB = market-to-book; TAM = Size.
Source: study's data.

Table 3, Panel A, shows that, on average, the companies in the sample more frequently presented earnings management by real activities than by accruals. Regarding the control variables, note that the companies in the sample have, on average, a market value three times higher than their equity value, as evidenced by the market-to-book.

Table 3, Panel B presents the descriptive statistics only for companies whose CEOs have a LinkedIn profile, with social media variables. In general, active CEOs and their followers appear to use all forms of interaction on LinkedIn social media. There is a high variability concerning the number of followers, posts, likes, and comments, indicated by a standard deviation higher than the mean. Additionally, the percentiles indicate that some CEOs have social media but do not post publications or have likes or comments on their pages.

Next, Table 4 presents the correlation matrices in Pearson's lower triangle correlation and Spearman's upper triangle.

Table 4
Spearman's and Pearson's Correlations

Variable	**AEM**	**REM**	**SEG**	**PUB**	**CUR**	**COM**	**MTB**	**TAM**
AEM	1	0.208*	0.070	0.081	0.064	0.065	0.067	-0.148*
REM	0.219*	1	0.196*	0.022	0.061	0.047	0.175*	-0.143*
SEG	0.061	0.127*	1	0.599*	0.665*	0.650*	0.012	-0.025
PUB	0.066	0.024	0.545*	1	0.919*	0.916*	-0.048	0.166*
CUR	0.075	0.045	0.637*	0.889*	1	0.973*	-0.015	0.134*
COM	0.073	0.054	0.610*	0.907*	0.982*	1	-0.063	0.134*
MTB	0.137*	0.275*	0.051	-0.037	-0.005	-0.008	1	-0.276*
TAM	-0.125*	-0.146*	0.013	0.126*	0.127*	0.129*	-0.242*	1

Legend: AEM = Earning Management by Accruals; REM = Earnings Management by Actual Activities; SEG = Logarithm of the number of followers on LinkedIn; PUB = Logarithm of the number of posts on LinkedIn; CUR = Logarithm of the number of likes on LinkedIn; COM = Logarithm of the number of comments on LinkedIn; MTB = market-to-book; TAM = Size; Level of significance: * p<0.5.
Source: study's data.

Table 4 shows that management by accruals (AEM) does not significantly correlate with any of the social media variables, indicating that the use of social media is not correlated with AEM. However, regarding earnings management by real activities (REM), a positive and significant correlation is found with the variable logarithm of the number of followers (SEG). In a preliminary analysis, this result suggests that the greater the use of social media, the greater the earnings management by real activities.

As for the other variables used as controls in this study, the correlation results indicate that market-to-book (MTB) and company size (TAM) were respectively positively and negatively correlated with AEM. The same behavior was found for the REM variable. Note that size was negatively correlated with REM and AEM, suggesting that larger companies less frequently manage results through accruals or real activities.

Table 5 presents the results of the relationship between CEOs' corporate use of LinkedIn social media, measured through the logarithm of the number of followers, posts about their companies, likes, and comments concerning posts with earning management by accruals. It should be noted that the assumptions of autocorrelation of residues and multicollinearity of variables were tested using the Durbin-Watson and VIF tests and did not present problems, as shown in Table 5.

Table 5
Earnings Management by Accruals and the Corporate use of Social media

Variables	Dependent variable: Earnings Management by Accruals (AEM)							
	Mod 1 Coef. (Est. *t*)	Mod 2 Coef. (Est. *t*)	Mod 3 Coef. (Est. *t*)	Mod 4 Coef. (Est. *t*)	Mod 5 Coef. (Est.*t*)	Mod 6 Coef. (Est.*t*)	Mod 7 Coef. (Est.*t*)	Mod 8 Coef. (Est. *t*)
Constant	0.0113** (1.97)	0.0729*** (3.25)	0.0122** (2.15)	0.0813*** (3.65)	0.0120** (2.10)	0.0871*** (3.63)	0.0120** (2.11)	0.0810*** (1.04)
SEG	0.0008*** (2.83)	0.0007*** (2.67)	-	-	-	-	-	-
PUB	-	-	0.0019* (1.81)	0.0022** (2.09)	-	-	-	-
CUR	-	-	-	-	0.0007* (1.82)	0.0008** (2.11)	-	-
COM	-	-	-	-	-	-	0.0010* (1.72)	0.0012** (1.98)
MTB	-	0.0006 (1.31)	-	0.0007 (1.43)	-	0.0007 (1.39)	-	0.0007 (1.39)
TAM	-	-0.0025*** (-3.03)	-	-0.0028*** (-3.40)	-	-0.0028*** (-3.40)	-	-0.0028*** (-3.38)
EF Sector	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	27.79	29.80	26.80	29.29	26.76	29.26	26.68	29.14
R^2 aj.	25.71	27.31	24.68	26.78	24.65	26.75	24.57	26.63
VIF	1.13	1.13-1.52	1.03	1.04-1.53	1.03	1.04-1.54	1.03	1.04-1.53
DW	2.007	2.002	2.012	2.009	2.004	2.001	2.006	2.004
N	322	322	322	322	322	322	322	322

Legend AEM = Earnings Management by Accruals in absolute values; SEG = Logarithm of the number of followers on LinkedIn; PUB = Logarithm of the number of posts on LinkedIn; CUR = Logarithm of the number of likes on LinkedIn; COM = Logarithm of the number of comments on LinkedIn; MTB = market-to-book; TAM = Size; VIF = Variance Inflation Factor; DW = Durbin-Watson; N = number of observations. Significance levels: * p<0.1, ** p<0.05, *** p<0.01.
Source: developed by the authors.

Table 5 shows that all regression models were significant. When the direct relationship between followers, posts, likes, and comments with earnings management by accruals is verified, the explanatory power of the models ranges from 24.57% to 25.71%. When the control variables are included, there is an increase in explanatory power of about 2% in all models.

The relationship between the CEOs' use of LinkedIn social media to publish information and earnings management through accruals (AEM) was confirmed. The positive sign indicates that the use of social media is related to more frequent accrual earnings management practices. Note that all social media variables showed a significant relationship, suggesting that, in addition to the CEOs' corporate posts, followers' responses to information published are also related to more frequent AEM practices.

These results are consistent with the literature addressing CEOs' use of social media, as it allows interaction with the company's stakeholders to establish ties and allows these managers to be perceived as more attentive and friendly (Bai et al., 2019; Elliott et al., 2018). Together, these factors strengthen the CEOs' reputation and may be linked to their choices of accounting practices, as earnings management by accruals evidenced in this study. This finding suggests that CEOs may act opportunistically when using social media to divert stakeholders' attention from earnings management practices to increase or reduce profits.

In economic terms, an increase of one standard deviation in the followers variable (SEG) is followed by an increase in the mean by 11.78% in the AEM variable (Table 3) [(4.566*0.0008)/0.031][1]. Regarding the posts variable (PUB), it appears that an increase of one standard deviation is associated with an increase of approximately 7% in the mean of the AEM variable (Table 3) [(1.141*0.0019)/ 0.031][1]. Finally, as for the likes (CUR) and comments (COM), an increase of one standard deviation in these variables is associated with an increase of 7.89% [(3.495*0.0007)/0.031][1] and 7,25% [(2.248*0.0010)/0.031][1] in the mean of MSA variable (Table 3).

As for the control variables, all models presented the same results regarding the sign; however, only size (TAM) was significant in relation to earnings management by accruals. This finding corroborates the literature (Gu et al., 2005), indicating that larger companies have fewer incentives to manipulate earnings due to the political costs involved.

This evidence confirms the opacity hypothesis, suggesting that more powerful and reputable CEOs tend to promote a less transparent information environment (Bartov & Mohanram, 2004; Abernethy et al., 2015; James et al., 2017); The corporate use of LinkedIn may contribute to this scenario, by allowing AEM practices to be masked. These findings do not allow rejecting hypothesis H_1 of this study concerning AEM, as they confirm that the use of LinkedIn social media by CEOs to disclose corporate information is positively related to the practice of earnings management.

In summary, the results suggest that the greater a CEO's engagement on LinkedIn, especially concerning the number of followers, the more frequent the accrual earnings management practices. This finding may also be linked to CEOs' particular interests. Hence, using a personal LinkedIn profile to publish corporate information may be a way of deceiving stakeholders about practices that reduce the quality of accounting information.

As an additional test to the results shown in Table 5, regressions without treatment of outliers were performed. The results confirm the evidence regarding the number of followers and likes; however, posts and comments did not show a significant relationship. Control variables indicate the same sign and significance with and without outlier treatment in all models.

1 Non-tabulated data concerning the total sample. Standard deviation of the logarithm of the number of followers: 4.566. Standard deviation of the logarithm of the number of posts: 1.141. Standard deviation of the logarithm of the number of likes: 3.495. Standard deviation of the logarithm of the number of comments: 2.248

A sensitivity test was performed to confer robustness to the results shown in Table 5. Hence, the study sample was allocated among the companies that managed results by accruals in order to increase or decrease profits. This test aimed to verify whether there was a difference between the use of LinkedIn by CEOs whose companies manage results through accruals, to increase or decrease results. Table 6 presents the results of this test.

Table 6

Earning management by accruals +/- corporate use of social media.

Variables	Dependent variable: Earnings Management by Accruals (AEM)							
	Positive Accruals				Negative Accruals			
	Mod 9 Coef. (Est. *t*)	Mod 10 Coef. (Est. *t*)	Mod 11 Coef. (Est. *t*)	Mod 12 Coef. (Est. *t*)	Mod 13 Coef. (Est.*t*)	Mod 14 Coef. (Est.*t*)	Mod 15 Coef. (Est.*t*)	Mod 16 Coef. (Est. *t*)
Constant	0.0397 (0.93)	0.0607 (1.46)	0.061 (1.48)	0.0.0602 (1.46)	0.0701 (2.44)	0.0766*** (2.69)	0.0757*** (2.61)	0.0747*** (2.60)
SEG	0.0010*** (2.38)	-	-	-	0.0005 (1.38)	-	-	-
PUB	-	0.0035* (1.76)	-	-	-	0.0025 (1.77)	-	-
CUR	-	-	0.0010** (1.96)	-	-	-	0.0008 (1.37)	-
COM	-	-	-	0.0017** (1.91)	-	-	-	0.0012 (1.28)
MTB	-0.0004 (-0.59)	-0.0003 (-0.45)	-0.0003 (-0.49)	-0.0003 (-0.46)	0.0014** (2.28)	0.0018** (2.56)	0.0018** (2.50)	0.0018** (2.50)
TAM	-0.0014 (-0.86)	-0.0022 (-1.40)	-0.0022 (-1.43)	-0.0022 (-1.41)	-0.0020* (-1.87)	-0.0022** (-2.09)	-0.0022** (-2.01)	-0.0021** (-2.00)
EF Sector	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	27.25	26.25	26.48	26.39	34.71	35.19	34.75	34.64
R^2 aj.	21.28	20.20	20.45	20.35	30.33	30.84	30.37	30.26
VIF	1.18-1.83	1.05-1.73	1.06-1.73	1.06-1.73	1.20-1.47	1.10-1.50	1.10-1.52	1.10-1.51
DW	1.982	2.018	2.016	2.015	2.188	2.203	2.186	2.191
N	146	146	146	146	176	176	176	176

Legend AEM = Earnings Management by Accruals in absolute values; SEG = Logarithm of the number of followers on LinkedIn; PUB = Logarithm of the number of posts on LinkedIn; CUR = Logarithm of the number of likes on LinkedIn; COM = Logarithm of the number of comments on LinkedIn; MTB = market-to-book; TAM = Size; VIF = Variance Inflation Factor; DW = Durbin-Watson; N = number of observations. Significance levels: * p<0.1. ** p<0.05, *** p<0.01.
Source: developed by the authors.

Table 6 shows that the regression models were significant, and all regression assumptions, Variance Inflation Factor, and Durbin-Watson presented results within the expected.

Regarding positive accruals, the variables followers, posts, likes, and comments showed a positive and significant relationship with AEM. These results indicate that CEOs using LinkedIn for corporate purposes adopt accrual earnings management practices to increase profits.

The same result was not found concerning negative accruals, since the positive relationship found was not significant. Such evidence suggests that LinkedIn is used by the CEOs of companies that manage results only to increase their profits, not to decrease them. This finding may indicate that CEOs see the need to convey only a positive view of their performance as managers to their stakeholders. Such evidence reinforces the opacity hypothesis, as it would promote a less transparent information environment (Bartov & Mohanram, 2004; Abernethy et al., 2015; James et al., 2017). Therefore, possibly one of the objectives of CEOs to use social media is to divert the attention of those interested in the company and mask earnings management practices through accruals.

Furthermore, the control variables used in the positive accruals regression models were not significant. The market-to-book control variable showed a significant positive relationship for negative accruals, suggesting that companies with a higher market value tend to manage earnings through accruals to reduce profits more frequently. Such findings differ from previous studies in the Chinese and American contexts since Wu et al. (2016) and Shiah-Hou (2021) show negative relationships between MTB and the practice of accrual management. The findings related to the size control variable corroborate the literature (Gu et al., 2005) by showing a negative and significant relationship. Such a finding suggests that larger companies tend to perform accrual earnings management practices less frequently to reduce profit values.

Additionally, regression models (Table 5) were performed using McNichols' (2002) model of earnings management by accruals as the dependent variable to confer greater robustness to the findings. This model considers current, past, and future operating cash flows, fixed assets, and revenue variation. The un-tabulated results were presented according to the main analysis, showing the same relationships regarding significance and sign. These findings reinforce that managers may use social media to mask accrual earnings management practices.

Next, Table 7 presents the results of the relationship between earnings management by real activities and CEOs' corporate use of social media.

Table 7

Earnings management by real activities and Corporate use of Social Media

Variables	Dependent variable: Earnings Management by Actual Activities (REM)							
	Mod 17 Coef. (Est. *t*)	Mod 18 Coef. (Est. *t*)	Mod 19 Coef. (Est. *t*)	Mod 20 Coef. (Est. *t*)	Mod 21 Coef. (Est.*t*)	Mod 22 Coef. (Est.*t*)	Mod 23 Coef. (Est.*t*)	Mod 24 Coef. (Est. *t*)
Constant	0.0057*** (2.80)	0.5453** (2.04)	0.0882*** (2.72)	0.592** (2.28)	0.0861*** (2.62)	0.611** (2.47)	0.0253*** (4.78)	0.6142** (2.38)
SEG	0.0005* (1.80)	0.0005* (1.67)	-	-	-	-	-	-
PUB	-	-	0.0087 (0.68)	0.0109 (0.85)	-	-	-	-
CUR	-	-	-	-	0.0045 (0.95)	0.0054 (1.14)	-	-
COM	-	-	-	-	-	-	0.0080 (1.08)	0.0093 (0.212)
MTB	-	0.0098 (1.42)	-	0.0102 (1.44)	-	0.0102 (1.43)	-	0.0101 (1.43)
TAM	-	-0.0196* (-1.85)	-	-0.0213** (-2.09)	-	-0.0221** (-2.18)	-	-0.0223** (-2.20)
EF Setor	Sim	Sim	Sim	Sim	Sim	Sim	Sim	Sim
Sig.	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
R^2	30.12	31.99	29.42	31.54	29.63	31.81	29.75	31.95
R^2 aj.	28.10	29.57	27.38	29.11	27.60	29.39	27.73	29.53
VIF	1.13	1.13-1.52	1.03	1.04-1.53	1.03	1.05-1.54	1.03	1.04-1.54
DW	2.1533	2.105	2.129	2.083	2.132	2.090	2.128	2.086
N	322	322	322	322	322	322	322	322

Legend AEM = Earnings Management by Accruals in absolute values; SEG = Logarithm of the number of followers on LinkedIn; PUB = Logarithm of the number of posts on LinkedIn; CUR = Logarithm of the number of likes on LinkedIn; COM = Logarithm of the number of comments on LinkedIn; MTB = market-to-book; TAM = Size; VIF = Variance Inflation Factor; DW = Durbin-Watson; N = number of observations. Significance levels: * p<0.1, ** p<0.05, *** p<0.01.
Source: developed by the authors.

As shown in Table 7, both models were significant, and all regression assumptions were met. The explanatory power of the models ranged between 27.38% and 29.57%.

Analyzing the relationship between the CEOs' corporate use of LinkedIn and earnings management by real activities revealed different results than those previously identified (AEM). Table 7 shows that only Model 17 presents a positive and significant relationship, at the 10% level, between the variable number of followers and earnings management by real activities. These findings suggest that CEOs with more followers – therefore, with greater media visibility – tend to perform earnings management through real activities (REM).

Only one of the social media variables (the number of followers) is positively and significantly related to REM. This finding may be linked to the fact that this type of management is more difficult for the market to perceive. Thus, CEOs may deem it unnecessary to mask this practice through the corporate use of tools linked to social media, such as, for example, the number of posts. Additionally, this result reinforces the view that CEOs may use social media to, among other reasons, mask earnings management practices by accruals, as these are more easily perceived by those using accounting information, which would justify such an action.

The results in Table 7 also differ regarding the effect of traditional media coverage. Comiran et al. (2018) found a negative relationship between traditional media coverage and REM, indicating that media attention attenuates the management of real activities (Comiran et al., 2018). Therefore, we may assume that CEOs' REM behavior is mitigated by traditional media coverage, but social media visibility would boost such behavior.

As for the control variables, only the results related to size confirm the findings in Table 5. Thus, consistent with the study by Gu et al. (2005), the findings indicate that larger companies have fewer incentives to manipulate earnings.

Thus, the results presented in Table 7 show that hypothesis H_1 cannot be rejected for REM since CEOs' use of LinkedIn to disclose corporate information when measured by the number of followers, was significantly related to the practice of earnings management by real activities.

In general, the results show, through the significant and positive relationship between the CEOs' use of LinkedIn to disclose corporate information and, mainly, for the practice of earnings management through accruals, that, while these technological platforms are used to inform, share opinion, maintain direct and real-time communication (Huang & Yeo, 2018; Miller & Skinner, 2015), they may also be used to mask management practices intended to decrease the quality of accounting information, at least in the sample addressed here. Therefore, this study corroborates the opacity hypothesis, which predicts that reputable and more powerful CEOs are negatively associated with earnings quality (Shiah-Hou, 2021).

Such findings can warn the market's participants, such as investors and shareholders, who use social media to be informed about these organizations' results. Hence, it is necessary to consider that information directly disclosed by CEOs can affect organizations and their reputations. Thus, they are incentivized to spread positive information, which can often be related to poor earnings quality.

5. Conclusions

This study investigated whether CEOs' use of social media to disseminate corporate information is related to decision-making on earnings management practices. Therefore, publicly traded companies integrating the IBrX100 were analyzed, considering the length in which the last CEO worked in each company, according to a survey conducted in January 2021.

Based on this study's main findings, the conclusion is that the use of LinkedIn by the CEOs of the companies analyzed here is positively related to earnings management through accruals and real activities. Therefore, hypothesis H_1 failed to be rejected. Furthermore, all media variables addressed here were positively and significantly related to AEM practices, suggesting that, in addition to the CEOs' posts, their followers' reactions to such posts also relate to more frequent AEM practices. However, regarding REM, only the variable number of followers was positively and significantly related; this finding indicates that the greater the visibility a CEO has on LinkedIn, the greater the REM practices. In addition to the primary analysis, the sensitivity test indicated that, in general, CEOs' use of LinkedIn is positively related to AEM practices only to increase the profits of the companies in the sample.

In summary, the evidence found in this study is consistent with the opacity hypothesis, in which managers with more power and reputation use accounting practices to manage earnings and, consequently, reduce the quality of accounting information. In this sense, LinkedIn's technological environment can be considered a viable channel to mask such practices and maintain active and direct communication with those interested in an organization.

This study's results contribute to the literature investigating the corporate use of social media by addressing the influence of media on the corporate environment, with uses that go beyond the dissemination of information. Additionally, when approaching such disclosures from the point of view of organizations' CEOs, it presents another perspective to investigate the influence of social media on the quality of accounting information, which has predominantly focused on the publication of companies. Additionally, the results show that social media, such as LinkedIn, can mask both AEM and REM practices.

This study has some limitations, such as the non-generalization of results, since only data belonging to companies listed in the IBrX100 were confronted with the use of LinkedIn. Future studies can expand this population – such as, for example, including all publicly traded companies listed on B3 – and consider other social media.

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