

# Corporate Use of Social Media and the Value Relevance

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## Abstract

**Objective:** to evaluate the influence of corporate use of social media, as a signal to the market, on value relevance in Brazilian companies.

**Method:** we collected the data based on Thomson Reuters Eikon and social media, Facebook and Twitter. The analysis took place using descriptive statistics, correlation analysis, and multiple linear regression OLS. In addition, we used the MOORA method to create a score for corporate use of social media.

**Results:** it shows that few companies use social media to disclose accounting information. However, the results indicate that the accounting information published on Facebook and Twitter is relevant, which allows us to infer that social media can be an important communication channel between companies and the market. Specifically, concerning the influence of the disclosure of accounting information on Facebook and Twitter on value relevance, we concluded that, when used for corporate purposes, social media increases the value relevance. Additionally, we found that both the most and the lowest profitable companies which disclose accounting information on social media show higher value relevance of their accounting information.

**Contributions:** provides a practical contribution to managers by verifying, through empirical evidence, that these platforms can bring benefits to organizations, such as, for example, the possibility of increasing value relevance and creating value. For investors, it helps by indicating that social media can be an important source of information to feed their decision models.

**Keywords:** Social Media, Value Relevance, Facebook, Twitter.

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## Introduction

This study addresses the signaling of accounting information through social media in the context of social networks, specifically Facebook and Twitter, and the relevance of this information to users, mainly investors and analysts. In this sense, faced with a dynamic environment, companies need to keep up with changes and make information available in real time. The Signaling Theory suggests that managers disclose relevant information to meet the demands of investors (Wang & Hussainey, 2013), and in this relationship social media constitutes a viable means to intermediate such communication.

The term social media has been applied to several technologies, which comprise a group of internet-based applications, such as blogs, social networks and websites, that allow communication between users and generates information (Kaplan & Haenlein, 2010). It is noteworthy that this research uses the term social media to refer to the social networks Facebook and Twitter. The choice of these networks is justified because these social networks offer a greater possibility of publishing different forms of news, such as images and texts, allow comments, likes and shares (Jung et al., 2018), making them more suitable for disseminating corporate information about accounting data. Also, according to Manetti et al. (2017) and Jung et al. (2018), Facebook and Twitter are the two most adopted social media platforms by companies.

Social media are constantly expanding tools, both at an individual and organizational level (Manetti & Bellucci, 2016; Agostino & Siroduva, 2017; Bartov et al., 2017; Hales et al., 2018), given the high number of people connected to the internet and social media around the world (Strauss & Frost, 2016). Amid the expansion of these tools, organizations seek to reformulate their structures and processes to obtain competitive advantages with their use (Kaplan & Haenlein, 2010). In this context, Lee et al. (2015) report that companies are starting to adhere to social media as a viable dissemination channel for important information, such as, in the case of this research, information related to accounting.

Studies highlight that corporate use of social media can predict changes in stock markets. At the national level, Arruda et al. (2015) point out that social media can affect the level of information asymmetry and Giordani et al. (2020) reveal that corporate use of social media is related to an abnormal return on shares, above the average of other companies in the sector.

In the international literature, Paniagua and Sapena (2014) revealed that social media interfere in financial, operational and social corporate performance aspects. Furthermore, Arnaboldi et al. (2017) highlight that they can improve organizational performance, through the collection and analysis

of information located in these channels. As highlighted by Zhang (2015), social media reaches a larger audience and, therefore, influences more investors and provides better returns to shareholders. Thus, from the moment organizations signal accounting information on social media, there may be an impact on the quality of accounting information, more precisely on the relevance of these organizations' accounting information.

Regarding the relevance of accounting information in the international context, research has associated it with the cost of capital (Francis et al., 2004), accounting information (Ohlson, 1995; Francis & Schipper, 1999; Lo & Lys, 2000; Beisland, 2009) and international accounting standards (Barth et al., 2008; Cormier & Magnan, 2016). In the national context, the relationship between value relevance and the process of convergence to international accounting standards was addressed (Macedo et al. 2012; Macedo et al., 2013; Gonçalves et al., 2014; Santos & Cavalcante, 2014; Santos et al., 2014; Santos et al., 2014; al., 2014); and accounting conservatism (Silva et al., 2018). Regarding voluntary disclosure, value relevance was analyzed in terms of environmental information (Hassel et al., 2005) and with corporate social responsibility (Degenhart et al., 2017).

In view of the above, we assume that information of an accounting nature disclosed on companies' social media increases the visibility of accounting numbers and can be perceived by investors as relevant in their decision-making process to buy or sell shares in the stock market. From the aforementioned context, this study proposes to answer the following research question: What is the influence of the corporate use of social media on the relevance of accounting information? The objective of this study is to evaluate the influence of the corporate use of Facebook and Twitter, as a signal sent to the market, on the relevance of accounting information in Brazilian companies.

Empirical research on the use of social media and the relationship with accounting data is still incipient in the literature (Miller & Skinner, 2015). Visualizing data in a meaningful way is considered a challenge in social media analytics research, as the volume and variety of data makes it difficult to visualize it effectively (Stieglitz et al., 2018). According to Miller and Skinner (2015), there are relatively few studies on how companies use social networks. These facts instigate further research, in the search for evidence that contributes to the literature that investigates the corporate use of social media.

Also, the study is justified by the importance of understanding the performance of companies in social media channels and

how the signaling of information in this environment influences the participants of the stock market and affects the company (Jung et al., 2018), indicating in what way such signals affect the relevance of accounting information. According to Teoh (2018), research data from social media are promising for accounting research, as they present the processing, influence and credibility of information for the capital market. In this sense, the development of research on the subject also contributes to the knowledge of companies about the corporate use of social media and its consequences for the stakeholders. Additionally, it contributes to the existing literature on value relevance, by addressing its relationship with the disclosure of accounting information on social media.

As practical contributions, this study's results can show companies that the use of social media to increase the visibility of accounting information can be important to reduce their cost of capital, improve their performance in the stock market, among other benefits. For investors, it may indicate that social media can be an important source of information to feed their decision models, improving the predictive capacity of the models, among other aspects.

## 2 Background and Hypotheses Development

The ways in which information about companies is produced, disseminated and processed are affected by changes, caused by the interaction between information technologies, social media and capital markets (Miller & Skinner, 2015; Bartov et al., 2017). The rise of online research on the internet, through technological equipment such as computers, smartphones and search engines in social networking applications, corresponds to an important resource for the types of information that investors actively seek. Thus, it is essential to analyze the sources of information and their processing (Teoh, 2018) to understand the dissemination of data in these channels and their relationship with the capital market.

Market participants have access to many sources of information, and accounting reports are not the only source available to these participants (Barth et al., 2001). It is inferred that with technological advances, the dissemination of information online in social media can reach a greater number of users, who can interact, comment, share links, like and, successively, influence the decision of investors, a fact that affects the value of the company and the relevance of the accounting information. Thus, disclosure does not need to be mandatory to have value relevance effects (Beisland, 2009).

Information is considered relevant when it affects stock prices, and within the scope of capital market efficiency, changes in stock

prices incorporate a broad class of accounting information (Ball & Brown, 1968). Based on the study by Ball and Brown (1968), which indicated a relationship between price and accounting result, through the association of stock price with the disclosure of accounting information, further studies were developed and included market gains to measure the relevance of accounting information (Ohlson, 1995). Thus, given the set of accounting information signaled by organizations, which includes information disseminated on social media, investors evaluate and react to this data, which may reflect on the quality of accounting information, and therefore, on the relevance of accounting information.

According to the Signaling Theory, discussed in Spence's (1973) seminal work, three elements are fundamental for signaling to occur, the signaler, the signal and the receiver. In the context of this research, we understand as signalers the companies that use social media for corporate purposes; the signals are the accounting information disclosed on social media; and the receivers correspond to the other social media users, who use the information disclosed by the companies in the decision-making process.

In this context, social media can contribute to the signaling of accounting information to the market, as they enable repetitive signaling, which increases its visibility, especially if the company uses different signals to communicate the same message (Balboa & Marti, 2007). Thus, they become appropriate platforms for building and managing business-related activities (Kaplan & Haenlein, 2010; Kumar et al., 2016; Mumi et al., 2019).

Technologies provide new communication channels, which allow signals to be transmitted in different ways (texts, videos, images, links) and the exchange of information between the company and users, through publications and comments (Teoh, 2018). These tools integrate new ideas and information from various internal and external sources (Lee et al., 2012; Piller et al., 2012) and can be used as a communication strategy (Mumi et al., 2019), which includes disclosure of accounting information (Manetti & Belluci, 2016).

Jung et al. (2018) report that a company can benefit from the use of social media, as these channels make it possible to disseminate information directly to their followers without intermediaries, control the time of dissemination of information, send repeated messages related to the same information and know the number exact number of followers. According to Blankespoor et al. (2013), these characteristics suggest that social media can be used by companies to signal, as a way to expand disclosure and fill the lack of investor information, since traditional media reach a smaller audience.

As evidenced in the study by Jung et al. (2018), the tendency

of companies to adhere to social media to communicate with investors has the potential to become an integral part of corporate disclosure policies. Companies use these channels to disseminate a variety of information, which includes earnings news, board and executive changes, new contracts and dividends (Jung et al., 2018). Regarding social media users, they are, simultaneously, consumers and producers of information, which favors the diffusion of communication (Agostino & Sidorova, 2017).

Previous research on corporate use of social media has linked the tool's adoption to one or two specific management functions (Cao et al., 2018), mainly related to marketing, such as sales and customer satisfaction (Rapp et al., 2013; Pham & Johnson, 2017). According to Chanda and Zaorski (2013), successful corporate use of social media can help organizations strengthen relationships with stakeholders, both internal and external, in a way that will benefit the organization's bottom line.

Chahine and Malhotra (2018) highlight that the effects of disclosing information on social media channels depend on the level of interaction wanted and the organization's characteristics, facts that reflect on investor decisions and market reaction. Therefore, in the case of financial markets, these facts would be reflected in the price of traded assets (Chahine & Malhotra, 2018).

According to Teoh (2018), companies that pay little attention to social media are neglected by investors. Blankespoor et al. (2018) conclude that when companies start posting earnings on social media, their turnover and liquidity improve. Thus, in the corporate environment, social media has become a high priority, as most of the traded companies are actively present on some type of social platform (Paniagua & Sapena, 2014).

Blankespoor et al. (2013) analyzed companies that initially adopted social media and showed that those with less visibility, which used social media to spread their news, could reduce information asymmetry and increase the liquidity of their shares. According to Zhang (2015), companies that are active in adopting new communication channels reach a larger audience and have greater impact on the market when compared to less active companies.

Manetti and Belluci (2016) explored the link between accounting and social media. The authors looked at whether organizations used social media to interact with stakeholders, specifically, they looked at the dissemination of sustainability reports on Twitter, Facebook and YouTube. The results indicated that a small number of organizations used social media to disseminate these reports. This way, the authors concluded that interacting with stakeholders, retrieving their opinions and collecting data was

not yet a common practice among organizations that posted sustainability reports.

Brown et al. (2015) showed that local investors had more access to companies in their locations and used social media on mobile devices to collect and disseminate their information, which consequently affected the negotiation activities of these organizations. In general, the authors highlighted that the increasing use of mobile technology influenced the acquisition and commercialization of local information.

Given this context, the literature on the corporate use of social media related to accounting presents evidence that these channels, when used by companies, influence performance and increase organizational visibility (Brown et al., 2015; Manetti & Belluci, 2016). From these findings, it is inferred that, in the same way, the use of social media by companies to disclose accounting information can influence the relevance of this information.

In summary, the signaling theory is a theoretical lens that can reveal how the corporate use of social media for the dissemination of accounting information contributes to explaining the return on shares and the market-to-book of companies. Also, the repetition of signals and sending signals in different channels makes signaling more efficient (Balboa & Marti, 2007), affecting investors' decision making (Connelly et al., 2011). In this way, the signaling of information on social media can impact the quality of accounting information, more precisely, increasing its relevance. Thus, the hypothesis of this research is presented:

H1: There is a positive relationship between the corporate use of social media and the relevance of accounting information in Brazilian companies

### 3. Methodological Procedures

The research population comprises companies listed on [B]3 (Brasil, Bolsa e Balcão — Brazilian stock exchange). The sample, in turn, was designed based on the companies that had information for all variables of the relevance of accounting information model, as shown in Table 4, and the economic-financial data were extracted from the Thomson Reuters Eikon database®. In addition, companies in the financial sector were removed from the sample due to the fact that they have specific characteristics of the sector and differentiated accounting standards. Also, outliers were excluded, corresponding, in this study, to observations above three standard deviations, with the aim of mitigating possible distortions in the analysis of the results. As a result, 16 observations were excluded. Thus, at the end of this process, the sample corresponded to 225

companies and 1,109 observations.

The research period considers the years 2013 to 2017. This period is justified because, according to Jung et al. (2018), corporate use of social media has grown considerably in a relatively short period, from less than 5% of companies in 2008 to more than 50% of companies in 2013. Thus, the analysis period begins in 2013, considering the adhesion of a greater number of companies to these channels.

Subsequently, the companies in the sample that had Facebook and Twitter accounts in the analyzed period were verified, as well as whether the companies that had these social networks disclosed accounting information on their pages. Table 1 shows the total survey sample and the number of companies that use social media, as well as disseminate information on these channels.

**Table 1: Research sample**

| Items  | Population | Sample | %   |
|--|------------|--------|-----|
| Companies  | 496        | 225    | 45% |
| Companies with Facebook                              | 166        | 122    | 73% |
| Companies with Twitter                               | 106        | 78     | 73% |
| Companies that disclosed accounting data on Facebook | 45         | 32     | 71% |
| Companies that disclosed accounting data on Twitter  | 35         | 23     | 65% |

Source: Research data.

To collect data in each social media, initially we checked each company’s website to see if they had links to direct social media pages, specifically to Facebook and Twitter. According to Jung et al. (2018), this step guarantees finding the company’s true corporate social media website, as opposed to those managed by communities or user groups associated with the company.

Subsequently, based on the study by Jung et al. (2018), we applied filters with the following keywords: earnings, profits, revenue, results, quarter, earnings per share and growth. It is noteworthy that in this research, when it comes to the disclosure of accounting information on Facebook and Twitter, it is referring to the disclosure of accounting information with the aforementioned terms.

We highlight that the focus of this research is the posts related to accounting information, thus, the analysis focuses on a total of 477 tweets, which correspond to the period of 5 years and 23 companies that published accounting information on this social network. Regarding Facebook, the final sample corresponds to 246 publications on accounting information, referring to 32 companies that published on this social media. Table 2 shows the number of companies and publications in each year of analysis.

**Table 2: Publications of the research sample**

| Items                 | 2013 | 2014 | 2015 | 2016 | 2017 |
|-----------------------|------|------|------|------|------|
| Facebook companies    | 21   | 16   | 15   | 17   | 16   |
| Twitter companies     | 5    | 9    | 12   | 14   | 19   |
| Facebook posts amount | 45   | 51   | 37   | 52   | 61   |
| Twitter posts amount  | 19   | 37   | 58   | 153  | 210  |

Source: Research data

In addition to the use and disclosure of accounting information, social media variables also refer to: in relation to Facebook, the number of posts, shares, likes, comments, followers and page likes; as for Twitter, the number of tweets, retweets, likes, comments, followers, users the company follows and the time the company uses the media. Table 3 shows the social media construct.

**Table 3: Construction of Social Media**

| Variable | Description   | Source   |
|----------|---|--|
| D_MS     | Dummy variable: 1 if on social media and 0 otherwise                      | Lee et al. (2015); Zhang (2015); Jung et al. (2018).                                       |
| D_MSC    | Dummy variable: 1 if accounting information was disclosed and 0 otherwise | Zhang (2015); Jung et al. (2018).  |
| S_MS     | Social media usage score formed by the MOORA method                       | Made by the authors.   |
| Facebook |   |  |
| F_N_IC   | Amount of posts referring to accounting information                       | Lee et al. (2015); Manetti e Bellucci (2016); Manetti et al. (2017).                       |
| F_N_CO   | Amount of shares referring to accounting information                      | Manetti and Bellucci (2016); Manetti et al. (2017).  |
| F_N_CUR  | Amount of likes referring to accounting information                       | Zhang (2015); Manetti and Bellucci (2016); Manetti et al. (2017).                          |
| F_N_COM  | Amount of comments referring to accounting information                    | Manetti and Bellucci (2016); Manetti et al. (2017).  |
| F_N_USE  | Natural log of the amount of users following the company                  | Zhang (2015); Manetti and Bellucci (2016); Manetti et al. (2017).                          |
| F_N_CP   | Natural log of the amount of users who like the company page              | Zhang (2015); Manetti and Bellucci (2016); Manetti et al. (2017).                          |
| Twitter  |   |  |
| T_N_T    | Total tweets amount   | Lee et al. (2015); Manetti and Bellucci (2016); Manetti et al. (2017); Jung et al. (2018). |
| T_N_IC   | Amount of tweets referring to accounting information                      | Lee et al. (2015); Manetti and Bellucci (2016); Manetti et al. (2017); Jung et al. (2018). |
| T_N_RT   | Amount of retweets referring to accounting information                    | Zhang (2015); Manetti and Bellucci (2016); Manetti et al. (2017); Jung et al. (2018).      |
| T_N_CUR  | Amount of likes referring to accounting information                       | Jung et al. (2018); Manetti and Bellucci (2016); Zhang (2015);                             |
| T_N_COM  | Amount of comments referring to accounting information                    | Manetti and Bellucci (2016); Manetti et al. (2017); Jung et al. (2018).                    |
| T_N_USE  | Natural log of the amount of users following the company                  | Zhang (2015); Manetti and Bellucci (2016); Manetti et al. (2017); Jung et al. (2018).      |
| T_N_UES  | Natural log of the number of users the company follows                    | Manetti and Bellucci (2016); Manetti et al. (2017); Jung et al. (2018).                    |
| T_N_A    | Number of years the company has used social media                         | Zhang (2015); Jung et al. (2018).  |

Source: Research data

The second construct contemplates the value relevance model developed by Cormier and Magnan (2016), which aims to analyze the change in economic agents' expectations regarding future results, through the informative content of the accounting numbers disclosed. Thus, accounting information is relevant if reflected in the share price.

The application of the value relevance model by Cormier and Magnan (2016) is justified because, according to the authors, market-to-book is a more robust and widely accepted variable, considered a reference for market evaluation. The authors argue that value relevance models that use share price/return as a dependent variable (Francis and Schipper, 1999) may present problems, since, according to Brown et al. (1999), if the company presents a stock split (one share divided into two new shares), its price would be reduced by half. Table 4 shows the variables, description and source of the value relevance model.

**Table 4: Relevance of accounting information**

| Variable Type         | Variable          | Description  | Source                    |
|-----------------------|-------------------|--|---------------------------|
| Dependent variables   | MTB <sub>it</sub> | Market-to-book – market value of equity divided by the book value of equity of company i in period t | Cormier and Magnan (2016) |
| Independent variables | PA <sub>it</sub>  | 1 divided by equity per share of company i in period t   |                           |
|                       | ROE <sub>it</sub> | Return on equity – net income divided by the total equity of company i in period t                   |                           |

Source: Research data.

It is noteworthy that from the data collected from social media, the MOORA method (Multi-Objective Optimization based on Ratio Analysis) was used to create a score for each social media (Facebook and Twitter). This score considered all companies that had social media and were part of the sample, as well as all information (Table 3) referring to each social media in each year of analysis. This score corresponds to the variable of interest, which refers to corporate use of social media.

The MOORA method is a multi-criteria decision analysis tool and consists of evaluating companies as a whole, calculated as follows: the data set is squared and, subsequently, divided by the sum of the data presented squared as denominators, the indexes used are situated between zero and one and added when the index aims at maximization, that is, the higher the better, or subtracted when it aims at minimization, that is, the lower, the better the indicator (Brauers & Zavadskas, 2006).

Subsequently, we analyzed the descriptive statistics of the variables exposed in the research constructs (Tables 3 and 4). We performed the Shapiro-Wilk normality test, which showed that the data are not normal, since the test was significant (Z=14.443; z<0.000). Next, we elaborated the Pearson and Spearman correlation matrix.

We operationalized Equation 1, which corresponds to the value relevance model, through OLS regression with robust standard errors (White correction) and fixed effects control by sector and year. The performance of robust regression is justified, since the White test was significant (P=249.81; p<0.000), which indicates the presence of heteroscedasticity. Regarding the control of sector and year fixed effects, according to Onali et al. (2017), the Joint F Test is useful to verify the importance of controls when inserted in the model. Thus, the inclusion of fixed effects control by sector and year is justified, since when inserted they were significant, which indicates that both provide the model with incremental explanatory power and allow the results to not be influenced by particular characteristics, such as the sector. Equation 1 relating to the value relevance model by Cormier & Magnan (2016) is presented below.

Equation 1

$$MTB_{it} = \alpha_1 + \beta_1 PA_{it} + \beta_2 ROE_{it} + \sum effects\_fixed\_sector_{it} + \sum effects\_fixed\_year_{it} + E_{it}$$

To analyze the relationship between corporate use of social media and the relevance of accounting information, we operationalized the regression model (Equations 2) OLS with robust standard errors and fixed effects control by year and sector.

Equation 2

$$MTB_{it} = \alpha_1 + \beta_1 PA_{it} + \beta_2 ROE_{it} + \beta_3 S\_MS_{it} + \sum effects\_fixed\_sector_{it} + \sum effects\_fixed\_year_{it} + \epsilon_{it}$$

Subsequently, we performed an additional analysis (Equation 2), to verify whether the relevance of accounting information published on social media was not linked to the profitability of the companies researched. For this, based on the return on assets (ROA), companies were classified into two samples, and those that presented values above (lower) than the median were considered more (less) profitable. It should be noted that the equations presented were analyzed with the two social networks separately to assess their relationship with the relevance of the accounting information.

## 4. Results Presentation and Analysis

This section is intended for the presentation and analysis of the results. Initially, we present the descriptive statistics of the research variables. Subsequently, we present the correlation matrix and, finally, we present the results of the analysis of the relationship between the corporate use of social media and the relevance of accounting information, as well as the additional



analysis. Table 5, Panel A, includes the mean, standard deviation, minimum, 25th percentile, median, 75th percentile and maximum of the total sample. Panel B presents the mean and standard deviation of the companies with the highest and lowest profitability and the Mann Whitney test of these groups.

**Table 5:** Descriptive statistics of variables

| Panel A: Total Sample |       |                    |         |        |        |       |         |
|-----------------------|-------|--------------------|---------|--------|--------|-------|---------|
|                       | Mean  | Standard Deviation | Minimum | P 25   | Median | P75   | Maximum |
| MTB                   | 2.002 | 6.663              | -1,636  | 0.426  | 0.978  | 2.012 | 15.571  |
| PA                    | 5.088 | 24.006             | 0.063   | 1.305  | 1.926  | 3.016 | 54.050  |
| ROE                   | 0.044 | 3.277              | -3.075  | -0.007 | 0.083  | 0.200 | 2.469   |
| S_FB                  | 0.229 | 0.376              | 0       | 0      | 0.213  | 0.288 | 4.131   |
| S_TW                  | 0.257 | 0.470              | 0       | 0      | 0      | 0.490 | 4.569   |

  

| Panel B: Companies with Higher and Lower Profitability |                      |                    |                     |                    |                   |          |
|--|----------------------|--------------------|---------------------|--------------------|-------------------|----------|
|  | Higher Profitability |                    | Lower Profitability |                    | Mann Whitney Test |          |
|  | Mean                 | Standard Deviation | Median              | Standard Deviation | Z                 | Sig.     |
| MTB  | 2,996                | 7,311              | 1,007               | 5,781              | 280,805           | 0,000*** |
| PA   | 2,667                | 5,468              | 5,509               | 12,028             | 49,690            | 0,000*** |
| ROE  | 0,111                | 2,064              | -0,026              | 4,153              | 193,029           | 0,000*** |
| S_FB   | 0,240                | 0,337              | 0,218               | 0,411              | 11,124            | 0,000*** |
| S_TW   | 0,292                | 0,480              | 0,222               | 0,456              | 8,938             | 0,000*** |

MTB=Market-to-book; PA=1/Shareholders' equity per share; ROE=Return on equity; S\_FB=score Facebook; S\_TW=Twitter score; Sig= Significance; P=Percentile.

Notes: Significance levels of the Mann Whitney Test: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01;

Source: Research data.

In Table 5, the market-to-book variable mean (2.002) indicates that most companies have a market value that represents more than twice their book equity. The return on equity (ROE) shows that, on average, companies are generating 4.4% of profit in relation to the amount invested.

As for Panel B, of the companies with higher and lower profitability, as expected, it appears that the most profitable companies have, on average, market-to-book and return on equity higher than the companies with lower profitability. As for the corporate use of social media, it is observed that both the most profitable and the least profitable companies use these platforms. Still, it appears that companies with lower profitability have a lower average, however, the difference is not significant.

Additionally, we performed the Mann Whitney Test to check for a significant difference between the groups of companies

with higher and lower profitability. As observed in Panel B, all variables showed significant differences between the groups, which may suggest that corporate use of social media, as well as the relevance of accounting information, will be different between companies with higher and lower profitability.

To analyze the association between the variables, the correlations shown in Table 6 were performed, the upper triangle includes Pearson's correlation and the lower one corresponds to the Spearman correlation.

**Table 6:** Pearson and Spearman correlation

| Variables | MTB     | PA       | ROE      | S_FB    | S_TW    |
|-----------|---------|----------|----------|---------|---------|
| MTB       | 1       | 0,275**  | -0,424** | 0,031   | 0,059*  |
| PA        | -0,040  | 1        | 0,103**  | -0,038  | -0,034  |
| ROE       | 0,155** | -0,282** | 1        | 0,004   | 0,000   |
| S_FB      | 0,196** | -0,088** | 0,075*   | 1       | 0,475** |
| S_TW      | 0,193** | -0,045   | 0,069*   | 0,642** | 1       |

MTB= Market-to-book; PA=Equity per share; ROE=Return on equity; S\_FB=score Facebook; S\_TW=Twitter score.

Notes: Significance levels: \* p<0.05, \*\* p<0.01; Spearman correlation underlined in gray.

Source: Research data.

Spearman's correlation matrix of the research variables provides preliminary evidence that the market-to-book (MTB) is positively correlated with the return on equity (ROE) at the 1% level, one of the explanatory variables of the value relevance model by Cormier and Magnan (2016). In Pearson's correlation, both explanatory variables of the model by Cormier and Magnan (2016) were correlated, at the level of 1%, with the market-to-book.

Regarding the corporate use of social media scores, in the Spearman correlation, it appears that Facebook (S\_FB) and Twitter (S\_TW) were positively correlated with MTB and ROE. These results suggest that companies with higher market values use Facebook and Twitter more for corporate purposes.

We emphasize that the correlation does not necessarily suggest a cause and effect relationship, but an association between the variables. Thus, the analysis of the relevance of accounting information is presented. It should be noted that the value relevance model by Cormier and Magnan (2016) has already been used in the Brazilian context in the study by Silva et al. (2018), who found that the metric is valid to measure the relevance of accounting information. Table 7 shows the model result.

**Table 7: Value relevance result**

| Variables                     | Dependent Variable: Market-to-book |              |
|-------------------------------|------------------------------------|--------------|
|                               | Cormier and Magnan Model (2016)    |              |
|                               | Coefficient                        | Statistics t |
| Constant                      | 0,126                              | 0,21         |
| PA                            | 0,131***                           | 7,91         |
| ROE                           | -1,151***                          | -8,47        |
| Sector and Year Fixed Effects | Sim                                |              |
| Model's Sig                   | 0,000***                           |              |
| R <sup>2</sup>                | 77,19                              |              |
| R <sup>2</sup> Adjusted       | 76,88                              |              |
| VIF                           | 1,05                               |              |
| Durbin Watson                 | 2,042                              |              |
| N                             | 1.109                              |              |
| <i>Joint F Test</i>           |                                    |              |
| Sector                        | 6,95***                            |              |
| Year                          | 5,14***                            |              |

\*\*\*significance at 1% level; \*\*5%; \*10%. OLS regression with robust standard errors and sector and year fixed effect control. VIF=Variance Inflater Factor; Sig=significance; N=Number of observations; PA=Equity per share; ROE=Return on equity.

Source: Research data.

As seen in Table 7, in relation to the model by Cormier and Magnan (2016), the explanatory power was 77% and the significance level was 1%. It is clear that both explanatory variables, equity per share and return on equity, proved to be significant at the 1% level. It is noteworthy that the first had a positive relationship, which suggests that the lower the equity per share, the higher the PA variable and, consequently, the higher the company's market value. However, the second variable (ROE) showed a negative relationship with MTB. In general, this result indicates that this information is relevant to the market.

The economic analysis allows us to infer, through the coefficient of 0.131 of equity per share, that the increase of one standard deviation in PA is associated with a 157% increase (0.131\*24.006/2.002 (Table 5)) in MTB in relation to the average. Regarding the return on equity (ROE), the coefficient of -1.151 indicates that the increase of one standard deviation in the ROE decreases -188% (-1.151\*3.277/2.002 (Table 5)) the MTB in relation to the mean.

The findings are in line with what was evidenced by Cormier and Magnan (2016), who also found a significant relationship between the explanatory variables and the market value. However, it differs when finding a negative relationship between return on equity and market value, which indicates that higher returns on equity would cause a reduction in market value. Furthermore, the results partially corroborate the study by Silva et al. (2018), who showed a significant and positive relationship

only between equity per share and market value.

The findings on value relevance match with international research by Aksu et al. (2017) and Outa et al. (2017). These studies showed that the information present in the financial statements is associated with the relevance of the accounting information, being useful to explain the pricing of shares.

In the national context, the results corroborate the study by Degenhart et al. (2017), who showed that accounting information as well as corporate social responsibility actions were relevant to the market. The study by Santos et al. (2014) showed that, after convergence to international accounting standards, the financial statements began to show more relevant information.

Subsequently, to analyze the relationship between the disclosure of accounting information on Facebook and Twitter and the market-to-book of Brazilian companies, the score formed from the information collected on the social media of each company was inserted into the model. Table 8 shows the results when social media score variables (S\_FB and S\_TW) are inserted in the model by Cormier and Magnan (2016).

**Table 8: Relationship between social media and value relevance**

| Variables                     | Dependent Variable: Market-to-Book |              |             |              |
|-------------------------------|------------------------------------|--------------|-------------|--------------|
|                               | Cormier and Magnan Model (2016)    |              |             |              |
|                               | Facebook                           |              | Twitter     |              |
|                               | Coefficient                        | Statistics t | Coefficient | Statistics t |
| Constant                      | -0,425                             | (-0,68)      | -0,491      | (-0,80)      |
| PA                            | 0,131***                           | (8,00)       | 0,131***    | (8,05)       |
| ROE                           | -1,153***                          | (-8,53)      | -1,153***   | (-8,56)      |
| S_MS                          | 1,151***                           | (4,50)       | 1,120***    | (5,58)       |
| Sector and Year Fixed Effects | Yes                                |              | Yes         |              |
| Model's Sig                   | 0,000***                           |              | 0,000***    |              |
| r <sup>2</sup>                | 77,59                              |              | 77,78       |              |
| R2 adjusted                   | 77,26                              |              | 77,45       |              |
| VIF                           | 1,05                               |              | 1,05 - 1,07 |              |
| Durbin Watson                 | 2,042                              |              | 2,037       |              |
| N                             | 1.109                              |              | 1.109       |              |
| <i>Joint F Test</i>           |                                    |              |             |              |
| Sector                        | 7,64***                            |              | 7,16***     |              |
| Year                          | 5,16***                            |              | 5,38***     |              |

\*\*\*significance at 1% level; \*\*5%; \*10%. OLS regression with robust standard errors and sector and year fixed effect control. VIF=Variance Inflater Factor; Sig=significance; N=Number of observations; PA=Equity per share; ROE=Return on equity; MS=Social media score. Source: Research data.

According to Table 8, regarding the explanatory variables of the model, equity per share (PA) and return on equity (ROE), the



results confirm the relationship shown in Table 7. In the case of the social media variable, both Facebook and Twitter showed a significant and positive relationship. In economic terms, in the case of Facebook, the coefficient of 1.151 indicates that the variation of one standard deviation in  $S_{FB}$  is associated with a 21% increase ( $1.151 \cdot 0.376 / 2.002$  (Table 5)) in MTB in relation to the mean. As for Twitter, the coefficient of 1.120 indicates that the variation of one standard deviation in  $S_{TW}$  corresponds to a change of 26% ( $1.120 \cdot 0.470 / 2.002$  (Table 5)) in the MTB in relation to the mean.

In general, these results demonstrate that the disclosure of accounting information via Facebook and Twitter is not only statistically significant, but also has economic relevance, due to possible variations in MTB (21% and 26%) resulting from changes in the levels of disclosure of accounting information on such social media.

The findings (Table 8) suggest that the corporate use of social media, Facebook and Twitter, to disclose accounting information is a positive factor for the organization, as it increases the relevance of the accounting information disclosed. This result corroborates what was reported by Jung et al. (2018), that the information disclosed in the social media environment influences the way capital market participants see the company. Thus, hypothesis H1 of this research is not rejected, as a positive relationship between the corporate use of social media and the relevance of accounting information in Brazilian companies was found.

To deepen the analysis on the corporate use of social media, we verified the relationship between the relevance of accounting information published on social media and the profitability of companies. To this end, the variable return on assets (ROA) was used to classify companies with higher and lower profitability (above and lower than the median). Table 9 shows the results of the value relevance model in relation to the companies with the highest and lowest profitability.

**Table 9:** Additional analysis of higher and lower profit companies

| Variables                     | Dependent Variable: Market-to-Book |                     |                                |                       |
|-------------------------------|------------------------------------|---------------------|--------------------------------|-----------------------|
|                               | Highest profitability companies    |                     | Lowest profitability companies |                       |
|                               | Facebook                           | Twitter             | Facebook                       | Twitter               |
| Constante                     | 1,709**<br>(2,24)                  | 1,427*<br>(1,70)    | -0,699<br>(-1,18)              | -0,650<br>(-1,14)     |
| PA                            | 0,145***<br>(64,62)                | 0,145***<br>(63,13) | 0,103***<br>(11,95)            | 0,103***<br>(11,90)   |
| ROE                           | -0,667***<br>(-4,02)               | -0,671**<br>(-3,97) | -1,258***<br>(-15,59)          | -1,257***<br>(-15,52) |
| $S_{MS}$                      | 1,632***<br>(3,76)                 | 1,077***<br>(3,78)  | 0,516***<br>(3,19)             | 0,459***<br>(2,76)    |
| Sector and Year Fixed Effects | Yes                                | Yes                 | Yes                            | Yes                   |
| Model's Sig                   | 0,000***                           | 0,000***            | 0,000***                       | 0,000***              |
| R <sup>2</sup>                | 78,51                              | 78,45               | 91,91                          | 91,90                 |
| R2 adjusted                   | 77,87                              | 77,81               | 91,67                          | 91,66                 |
| VIF                           | 1,05 – 1,08                        | 1,05 – 1,08         | 1,08 – 1,11                    | 1,08 – 1,11           |
| Durbin Watson                 | 2,073                              | 2,078               | 2,052                          | 2,040                 |
| N                             | 554                                | 554                 | 554                            | 554                   |
| <i>Joint F Test</i>           |                                    |                     |                                |                       |
| Sector                        | 6,42***                            | 5,30***             | 2,66***                        | 2,62***               |
| Year                          | 1,06                               | 1,26                | 3,50***                        | 3,49***               |

\*\*\*significance at 1% level; \*\*5%; \*10%. OLS regression with robust standard errors and sector and year fixed effect control. Coef.=Coefficient; (Est. t)=Statistic t (in parentheses); VIF=Variance Inflator Factor; Sig=significance; N=Number of observations; PA=Equity per share; ROE=Return on equity; MS=Social media score.

Source: Research data.

According to the results, the variable of interest  $S_{MS}$  was significantly and positively related to the Market-to-book. Regarding the group of most profitable companies, the economic analysis of the coefficient 1.632 allows us to infer

that the increase by one standard deviation in the Facebook corporate use score ( $S_{FB}$ ) is associated with an increase of 18% ( $1.632 \times 0.337 / 2.996$  (Table 5 Panel B)) in the companies' market-to-book in relation to the average. This increase is about 17% ( $1.077 \times 0.480 / 2.996$  (Table 5 Panel B)) in the case of Twitter.

These findings suggest that the most profitable companies that adopt social media tools for corporate use and disclose accounting information have more relevant accounting values for investors and other stakeholders in the organization. This evidence is consistent with the study by Pearson and Wegener (2013), who reported that companies that use social media tools perform better. It is also in accordance with the Signaling Theory, indicating that accounting information signaled via Facebook and Twitter is efficient (Connelly et al., 2011), as it increases its visibility and influences investor attitudes, which can maximize accounting information relevance.

As for the companies with lower profitability, the variable of interest, social media score ( $S_{MS}$ ), proved to be significant, both on Facebook and Twitter, at the level of 1%. In economic terms, the coefficient 0.516 indicates that the increase by one standard deviation in the corporate Facebook use score represents an increase in the market-to-book of companies with lower profitability of 21% ( $0.516 \times 0.411 / 1.007$  (Table 5 Panel B)) in relation to the mean. Within the realm of Twitter's social media, this increase is 20% ( $0.459 \times 0.456 / 1.007$  (Table 5 Panel B)).

These results suggest that, like the most profitable companies, those with lower than median profitability also use social media platforms to disseminate and give greater visibility to accounting information, which positively impacts the relevance of accounting information, measured by the market-to-book. The results suggest that both the most and the least profitable companies that disclose accounting information on social media have greater accounting information relevance. Such evidence may be linked to the fact that these channels allow for more efficient signaling, as they allow direct communication with low processing cost, as well as making it possible to send the same signal several times and in different ways.

Additionally, we operationalized regressions (not tabulated) with control variables. The variables size, revenue growth and leverage were inserted to control other factors that may influence the companies' market value. These variables were inserted into the equations in Tables 8 and 9. The results confirm the ones shown above and present an incremental explanatory power to the models, providing robustness to the findings.

In general, the study shows that companies that adopt more

informative disclosure practices, which include the disclosure of accounting information through social media, tend to have higher quality accounting numbers, in the sense that their net results and equity values will be more associated with company value and stock returns. This, in turn, may provide a reduction in its cost of capital, as more informed shareholders and investors are available.

In this sense, we can infer that the corporate adoption of social media can be used as a tool by accounting to assist in the accounting information disclosure, which can influence organizational performance and mitigate information asymmetry. This research provides empirical evidence on the relevance of engagement regarding the use of social media and provides answers for companies that seek to understand the effects and consequences of corporate use of social media on company value.

The results shed light to companies on the advantages of aligning their social media initiatives with organizational goals. In addition, they help to understand that, by determining the use of social media as reliable instruments of involvement between stakeholders, it is possible to contribute to the materiality and relevance of the accounting information disclosed.

## 5. Conclusion

The goal of this research was to evaluate the influence of the corporate use of Facebook and Twitter, as a signal sent to the market, on the relevance of accounting information in Brazilian companies. To this end, 225 companies were investigated between 2013 and 2017. Based on the model by Cormier and Magnan (2016), multiple linear regressions were performed with the inclusion of social media variables. In general, we found that, in the analyzed context, few companies use the media for this purpose — only 13% of the investigated population. However, in the case of Twitter, a constant increase was observed during the analyzed period in relation to the number of companies that started to use the media to disclose accounting information.

Regarding the relevance of accounting information in Brazilian companies, we concluded that accounting information is relevant when evaluated in relation to the market-to-book. Regarding the influence of the disclosure of accounting information on Facebook and Twitter on the relevance of accounting information, we concluded that social media usage, when used for corporate purposes, increases the relevance of accounting information. Thus, the positive relationship between the corporate use of social media and the relevance of accounting information was confirmed through the tested empirical model, which led to the non-rejection of hypothesis

H1 of the research. Additionally, we found that both the most profitable and the least profitable companies that disclose accounting information on social media have greater relevance of accounting information.

Evidence allows us to infer that companies are seeking to insert these new tools (social media) provided by technological advances into their organizational structures. This research provides a practical contribution to managers, by demonstrating, through empirical evidence, that these platforms can bring benefits to organizations, by improving the relevance of the accounting information disclosed, which can reduce the cost of capital, for example.

Another important contribution of this study is about the differences found in the analyzed social media. The corporate use of Twitter had a superior influence on the Market-to-Book. This finding helps both managers and investors regarding the choice of media to spend resources and attention. Additionally, for investors, it indicates that social media can be an important source of information to feed their decision models.

This research contributes to the functioning of the market in general by showing that these channels can enable more efficient signaling, since they allow direct communication with low processing cost and send the same signal several times and in different ways. The study also contributes to the literature on the relevance of accounting information by verifying its relationship with disclosures in social media, which allow the integration between company and investors and influence the users of these channels and those interested in the capital market. Finally, these findings may also be important for government agencies, regulators and standard-setters, since the analyzed context has no regulation on the corporate use of social media to disclose accounting information.

As a limitation, there is the fact of not being able to separate the effect of voluntary disclosure of accounting information on social media from other posts through such media, which can affect the relevance of accounting information, as well as not having control over whether the information was disclosed on social media before or after the publication of the official financial statements. The use of a limited number of keywords to characterize social media disclosure as coming from accounting information can also contribute to a possible bias in the analysis.

Future research could investigate accounting determinants in relation to social media adoption and voluntary disclosure of accounting information. New studies can also consider other contexts and extend the period of analysis, as well as the number of words investigated. In addition, further research is needed in later periods, because, as evidenced, there is a tendency for the

flow of accounting information in these channels to increase, due to the adhesion of more companies to these media, which may bring new evidence about the relationship between corporate use of social media and value relevance.

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