Research Article

Corporate Voices Through Crisis: Length, Readability, and Tone Shifts in Integrated Reports Pre-, During-, and Post-Pandemic

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This study examines how South African companies adapted the language and tone of their integrated reports during the COVID-19 crisis, focusing on three periods—before, during, and after the pandemic. Using Kruskal-Wallis and Mann-Whitney U tests, the integrated reports of Johannesburg Stock Exchange-listed companies were analysed for changes in report length, readability, narrative tone, and net sentiment. The findings reveal increased report length and more accessible language post-pandemic, aligning with stakeholder theory by addressing the need for transparency. During the pandemic, companies balanced positive and negative language to reassure stakeholders, consistent with impression management theory. Post-pandemic, reports exhibited more positive language and net sentiment, signalling optimism and recovery. This study contributes to the literature on corporate crisis communication in emerging markets, demonstrating how companies strategically adjust narratives to foster trust and resilience during crises. Practical implications guide corporate leaders in enhancing stakeholder communication during turbulent periods.

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1. Introduction

Events such as pandemics, crashes, and scandals pose a risk to companies' reputations. Effective communication reduces harm and fosters confidence, exemplifying strong business value. Analysing how companies respond during crises provides valuable insights into corporate narratives. These stories have the power to influence how the public sees things, gives confidence to those involved, and guides future decisions. Although research has been conducted on the impact of tone in corporate communication on

stakeholders, there is still a lack of knowledge about how companies modify their communication approaches during crises.

In addition to harming people's physical health, the COVID-19 pandemic has also had a significant impact on the economy and the functioning of businesses[1][2][3]. The biggest impact observed was a decline in sales, leading to reduced profits and cash flow for businesses. The global economy suffered greatly during the COVID-19 pandemic, with a 3.9% decrease in world GDP from 2019 to 2020, as estimated by the IMF, marking it as the most severe recession since the Great Depression[4]. This paper explores the readability, tone, and sentiment conveyed in letters to shareholders of South African companies amidst the turbulent financial and economic conditions brought about by the COVID-19 pandemic. The goal is to examine whether the reporting styles of a company mirrored both its financial performance and the unpredictable environment it faced during a recent crisis. Earlier research examining the systemic shock of the 2008/2009 Global Financial Crisis revealed a significant impact on the readability, tone, and sentiment of corporate reports[5][6][7][8][9][10].

Narrative disclosures aim to diminish the information asymmetry between managers and the market[11][12][3][6][13][14]. Managers can undermine effective communication by omitting information, complicating it, emphasising certain points too much, or being uncommunicative. This can result in heightened information asymmetry or a skewed perception of the organization[7][8][15]. Despite being typically based on the incremental information theory, disclosure often leads to impression management, resulting in the potential for misinforming rather than informing. The alleged 'strategic' motivation for sharing information is frequently observed during challenging times[11].

Studying narrative non-financial disclosures is becoming more crucial in accounting research, with researchers finding that reports have distinct linguistic styles that influence tone and sentiment. Narrative disclosure serves as a vital link between a firm and its stakeholders, playing a crucial role in making informed investment choices[12][14][16]. Businesses should recognise that they have multiple stakeholders and strive to address the needs of various interest groups[17]. Present-day markets involve a growing number of casual investors, who can be influenced by clarity, tone, and prejudice in business communications[18]. A company can adjust narratives to their advantage, such as concealing bad news and highlighting good news[19][6]. According to psychological, agency, and economic theories, managers may be motivated to alter information[19][18][20]. Despite being mostly unregulated, letters to shareholders can

still be relied upon by analysts as a credible source of information because of their potential for manipulation of readability, tone, and sentiment[21][22][6][23][13].

Johannesburg Stock Exchange (JSE)–listed companies are known for their high-quality reporting, as South Africa has consistently ranked well in the World Economic Forum for audit and reporting capabilities despite recent state capture and corporate scandals[13]. South African companies listed on the stock exchange were among the first in the world to adopt the principles of the International Integrated Reporting Framework in 2010, as advised by the former King III report, which was later revised to the present King IV report in 2016. Accountability of stakeholders is essential for corporate reporting in South Africa. This research focused on analysing readability, tone, and sentiment in corporate communications within the specific environment of JSE–listed companies in South Africa.

In this study, an expansion of the study by Esterhuyse and Du Toit[24], we explore the readability and narrative tone of integrated reports of companies listed on the JSE to investigate the effect of the COVID-19 pandemic may have had on narrative disclosures. Previous studies have shown that economic disruptions and negative developments have a notable effect on the language used in business communication, such as shareholder letters, press releases, and conference calls[5][25][9][26]. Effective communication during times of crisis is especially important as it has the power to calm investors and rebuild or maintain confidence in the organisation[10].

This research is of interest to readers because it examines how South African companies operating in an emerging economy adapted their communication strategies in response to the COVID-19 pandemic, a global crisis that significantly disrupted businesses and economies. Given the critical role of corporate narratives in influencing stakeholder perceptions and fostering confidence during uncertain times, understanding shifts in readability and narrative tone in integrated reports provides valuable insights into corporate behaviour. While prior studies have explored the impact of crises on corporate communication, there is still a gap in the understanding of how companies modify their reporting styles during such events, particularly in emerging markets. This study addresses this gap by analysing the narrative disclosures of JSE–listed companies, offering relevant findings for scholars and practitioners interested in corporate governance, sustainability, and crisis communication strategies.

The next part presents the literature, ending with the hypotheses tested in this study. The research method is explained in the third section. The findings are discussed in the fourth section, and the last section explores potential insights that could be gained from further analysis of tone and sentiment.

2. Literature review and hypothesis development

2.1. Theoretical foundation

Stakeholder theory, introduced by Freeman[27], posits that organisations should not only focus on maximising shareholder value but should also consider the interests and needs of various stakeholders, including employees, customers, suppliers, and the community. This theory argues that sustainable business practices require aligning corporate actions with the expectations of these diverse groups, particularly in times of crisis when stakeholder concerns are heightened[28][27]. According to stakeholder theory, organisations are expected to act responsibly and transparently to maintain trust and legitimacy among stakeholders, which is essential for long-term success[29]. In the context of this study, stakeholder theory provides a useful framework for interpreting the significant shifts observed in the length, readability, and tone of integrated reports during and after the COVID-19 crisis. As a pandemic creates unprecedented levels of uncertainty, stakeholders demand more transparent and accessible information on companies' resilience and strategic responses.

Impression management theory, initially conceptualised by Goffman[30], suggests that individuals and organisations strategically present information to shape others' perceptions and maintain a desired image. In the corporate context, impression management involves selectively disclosing information, emphasising positive aspects, and downplaying negative information to create a favourable impression on stakeholders[31][32]. Organisations may use impression management techniques in their reports to influence stakeholder perceptions, particularly during challenging times, by highlighting resilience and optimism while minimizing the perception of risk[33]. This theory is particularly relevant to this study as the results indicate a strategic shift in language tone and sentiment in response to the pandemic.

Both stakeholder and impression management theories provide a strong theoretical foundation for this study. The stakeholder theory explains the observed shifts in report length and readability as responses to stakeholder demands for transparency and trust during uncertain times. On the other hand, impression management theory offers insights into the strategic use of language tone and sentiment as companies seek to maintain a favourable image. Together, these theories help explain how companies adapted their integrated reporting practices to navigate the challenges of the COVID-19 crisis and address evolving stakeholder expectations.

2.2. Report length, readability and narrative tone

According to Hassan et al.[6], effective communication relies on various aspects of the corporate reports. Research on the length of corporate reports highlights the balance between transparency and the risk of information overload. Longer reports are often associated with increased transparency as they tend to include more comprehensive disclosures to address stakeholder needs[34]. However, an excessive length can overwhelm readers and reduce the accessibility of critical information. Some studies also suggest that companies may use lengthy reports as an impression management tool, masking negative information within extensive disclosures to create a sense of thoroughness[31]. Furthermore, report length is linked to readability: longer reports are often more complex, potentially hindering engagement, especially for non-expert stakeholders[35]. The impact of report length extends to investor behaviour, and longer reports can lead to investor scepticism, as they may interpret length and complexity as signs of obfuscation, particularly in high-risk industries[36][37]. These findings underscore the nuanced role of report length in corporate communication, which influences transparency, stakeholder perceptions, and accessibility.

Ensuring readability is key to effectively communicating valuable information to readers[38]. Earlier studies discovered a clear connection between the readability of narrative disclosures and different company performance measures, such as earnings[19][18][6][35][26]. Typically, when companies do not perform well, readability is often low. Studies have also found that the intricacy of narrative disclosures can impact both stock returns and transaction volumes[18]. The readability of corporate publications varies during a crisis. Research by Zharfpeykan and Ng[17] indicates a change in emphasis when reporting, giving importance to the concerns of vulnerable stakeholders and recognizing proactive measures taken to address these issues. In times of crisis, one would expect a text to be easier to read.

Prior studies indicate a relationship between corporate communication tone and company performance, especially during crises, as shown by multiple researchers[21][39][40][3][41][7][42][43][44][14][45]. Alshorman and Shanahan[21] discovered that optimism determines market valuation and profitability.

Studies in the field of accounting and finance suggest uncertainty in the tone conveyed in the stories found in financial reports from companies[46][47][41]. Experts concur that the emotions expressed in the qualitative parts of business communication play a role in decreasing the uneven distribution of information between the company and interested parties, offering crucial observations for forecasting future success[47]. Nevertheless, growing evidence indicates that companies might exploit this method to manipulate external opinions in their favour, using what is known as impression management[46][47][41].

These methods manipulate language to introduce bias in financial disclosures and diminish trust in the shared information[48].

During a crisis, we can assess narrative tone aspects that are usually difficult to gauge. Esterhuyse and Du Toit[24] explored the readability and tone of shareholder letters during the COVID-19 period, highlighting shifts in sentiment and complexity as a means of strategic impression management. It is expected that the readability, tone, and overall sentiment of letters to shareholders will be affected by COVID-19 as an external event. The debate on how a crisis can affect the readability, tone, and sentiment of letters to shareholders can be argued in both positive and negative ways[8]. A crisis can result in decreased performance, prompting attempts to disguise the decline through impression management. However, during a crisis, there may be a greater demand for transparency, leading to a decrease in the level of impression management in corporate communications.

This research proposes four hypotheses to investigate whether a systemic shock, such as the COVID-19 pandemic, impacted the length, readability, narrative tone, and net sentiment of the integrated reports of JSE-listed companies.

- H1. The COVID-19 crisis affected the length of integrated reports
- H2. The COVID-19 crisis affected the readability of integrated reports
- H3. The COVID-19 crisis affected the different tones employed in integrated reports
- H4. The COVID-19 crisis affected the net sentiment of integrated reports

3. Research Method

This longitudinal study investigated disclosures before, during, and after a specific event[5][6], in this case the COVID-19 pandemic. We analysed the available integrated reports of all companies listed on the JSE for six years, from 2018 to 2023. The years 2018 to 2019 represent the period before COVID-19, and 2020 to 2021 represent the peak periods of the COVID-19 pandemic, with 2022 and 2023 representing the period after COVID-19. The sample consisted of 1481 reports. Due to delistings, new listings, as well as merger and acquisition activities, the number of reports differs between the three periods. However, this study aims to analyse report length, readability, narrative tone, and net sentiment in integrated reports in general over the three periods.

Readability was established using the Flesch-Kincaid measure using the Readability Studio 2021 software. The benefit of using software and readability formulae lies in their objectivity, simplicity, and economy[19].

The Flesch–Kincaid measure is generally accepted as an effective method for measuring readability[18][38] [35][36]. The Flesch–Kincaid readability measure estimates how easy a piece of text is to understand by analysing sentence length and word complexity. The score indicates the level of schooling required to comprehend the text. A higher score indicated a more challenging text.

Tone can be discerned in a variety of communications. Methods such as interviews and questionnaires have low response rates and recall bias because of intrinsic flaws[5]. These practical challenges can be overcome using public documents such as integrated reports. When gauging the tone and sentiment of corporate communications, Loughran and McDonald[43] found that word lists created expressly for business settings were the most accurate. Thus, the word lists created by Loughran and McDonald[42] are the most appropriate for this field. Their word lists were specifically prepared to be suitable for accounting texts, noting that words such as 'depreciation', 'liability,' 'foreign' and 'board' may carry a different tone in accounting than in general text[42]. Financial-specific word lists are thus better at explaining letters to shareholders than generic word lists[14]. In this study, tone was investigated in terms of the word lists from Loughran and McDonald[42], which include 2 355 negative terms for a negative tone, 354 positive terms for a positive tone, 297 terms relating to uncertainty, 27 weak modal terms, 19 strong modal terms, and 185 constraining terms.

For analysis purposes, individual tones are determined as the frequency of the six Loughran and McDonald word lists as a percentage of the total words in the letter to shareholders[49]. Descriptions of what the different types of words mean are presented in Table 1.

Word Category	Description	Examples
Constraining Words	Words that imply limitations, restrictions, or barriers. These words may indicate that the company faces constraints or is limited in certain actions.	constraint, restrict, limit, prevent, prohibit, hinder
Litigious Words	Words related to legal actions, disputes, or regulatory matters. They often suggest the potential for or existence of legal issues or compliance challenges.	lawsuit, complaint, court, enforce, liability, regulation, penalty
Negative Words	Words with negative connotations, often used to indicate challenges, risks, or adverse events.	loss, decline, failure, risk, decrease, adverse, reduce
Positive Words	Words with positive connotations, suggesting growth, success, or favourable conditions.	gain, increase, growth, success, achievement, benefit, improve
Strong Modal Words	Words that express strong certainty or necessity. They indicate a high level of commitment or likelihood of an action or outcome.	must, will, need, always, certainly
Weak Modal Words	Words that express possibility, probability, or lesser certainty. These words suggest flexibility or a lower level of commitment.	might, may, could, possibly, perhaps
Uncertainty Words	Words that indicate doubt, risk, or lack of predictability. They often suggest unclear future outcomes or unpredictability in conditions.	uncertain, maybe, risk, doubt, contingent, depend, fluctuate, volatile

Table 1. Loughran and McDonald word lists

Following Rahman[50] and Du and Yu[51], the net sentiment of integrated reports is determined by the prevalence of using positive vs. negative words. It is calculated as

Net Sentiment = (Positive − Negative)/(Positive + Negative).

The Kruskal-Wallis test was then used to evaluate whether the differences in total words, readability, narrative tone, and net sentiment were statistically significant over the three periods considered. The Kruskal-Wallis test is appropriate for testing differences between three periods when the data are non-parametric because it does not assume a normal distribution, unlike ANOVA. Instead, the Kruskal-Wallis

test evaluates whether the median ranks differ significantly across the groups. By comparing the ranks rather than the means, the Kruskal-Wallis test provides a robust alternative to ANOVA.

As a post-hoc test, the Mann–Whitney U test was also applied to evaluate the three periods separately. The Mann–Whitney test is an appropriate post-hoc test following the Kruskal–Wallis test because it is specifically designed to compare the ranks of two independent groups. If the Kruskal–Wallis test shows a significant difference across three or more groups, it means that at least one group differs, but it does not indicate where the differences lie. The Mann–Whitney U test addresses this by allowing pairwise comparisons between individual groups (e.g., "before" vs. "during," "before" vs. "after," and "during" vs. "after"). This is an important test for identifying exactly which groups differ significantly, adding depth and clarity to the findings. To interpret the results of the Mann–Whitney U test over the three periods, a Bonferroni correction was performed. This means that the p-value must be adjusted to control for family-wise error rate. For the Bonferroni correction, we divided the appropriate significance level (p < 0.05) by the number of comparisons. For three comparisons, the corrected significance level was

$$\alpha_{adjusted} = \frac{0.05}{3} = 0.0167$$

This means that for each Mann–Whitney U test, the result is only statistically significant if the p-value is less than 0.0167.

4. Results

The data for the study are presented in Figures 1–4, showing the three periods before, during, and after COVID-19. This illustrates how the pandemic has affected corporate disclosure.
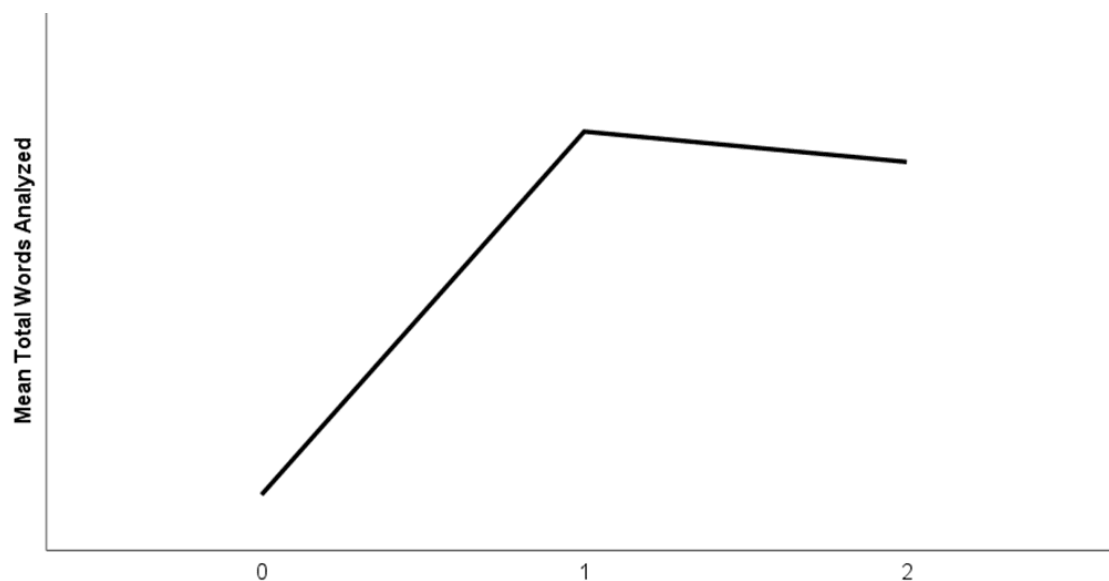
Figure 1. Report length over the three periods

The line graph in Figure 1 illustrates the mean total number of words analysed across three distinct periods: before COVID-19 (labelled as 0), during COVID-19 (labelled as 1), and after COVID-19 (labelled as 2). This trend shows a significant increase in the length of reports during the COVID-19 period, as represented by a sharp upward slope from the pre-COVID period to the COVID-19 period.

Although there is a slight decline in mean total words after the COVID-19 period, the report length remains substantially higher than in the pre-COVID period, suggesting that companies continued to produce more extensive reports post-pandemic. This trend may reflect an ongoing need for detailed disclosures or increased transparency in communication with stakeholders even after the immediate crisis of COVID-19. The graph visually underscores that the expansion in report length during the COVID-19 pandemic has not reverted to pre-pandemic levels, indicating a potentially lasting impact on corporate communication practices.
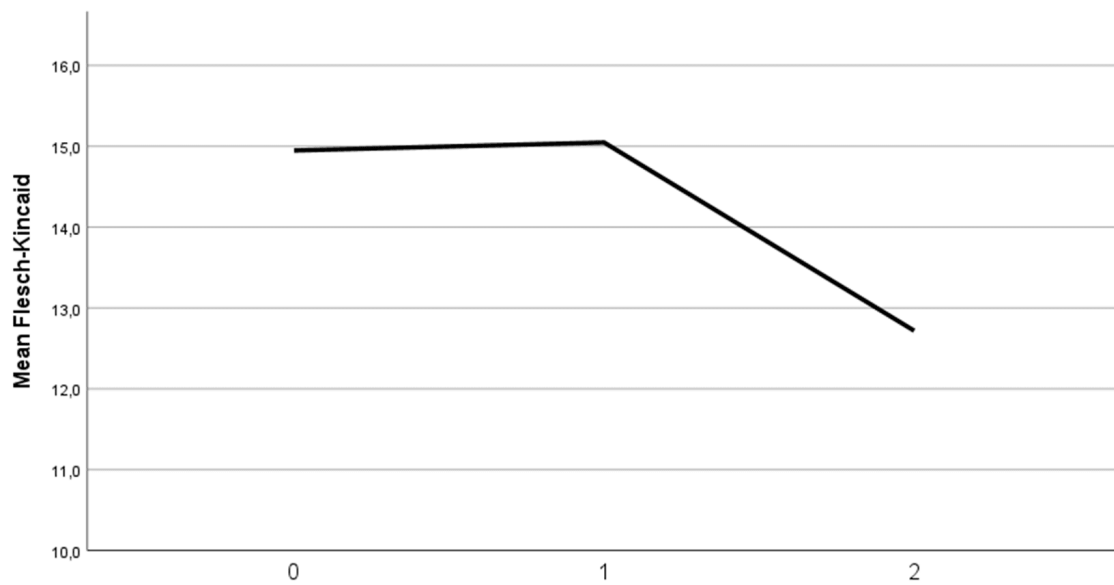
Figure 2. Readability over the three periods

Figure 2 presents the mean Flesch–Kincaid readability score for corporate reports across three periods: before COVID-19 (0), during COVID-19 (1), and after COVID-19 (2). The Flesch-Kincaid score, where higher values indicate more complex and less readable text, shows that readability was relatively poor both before and during the COVID-19 pandemic, with scores around 15 indicating high complexity in language.

However, there was a marked improvement in readability after COVID-19, as evidenced by a substantial decline in the mean Flesch-Kincaid score, which dropped closer to 12. This trend suggests that companies adopted simpler and more accessible language post-pandemic, potentially as part of an effort to enhance transparency and engagement with stakeholders. The decline in readability scores post-COVID-19 reflects a clear shift towards more straightforward communication in corporate reports.
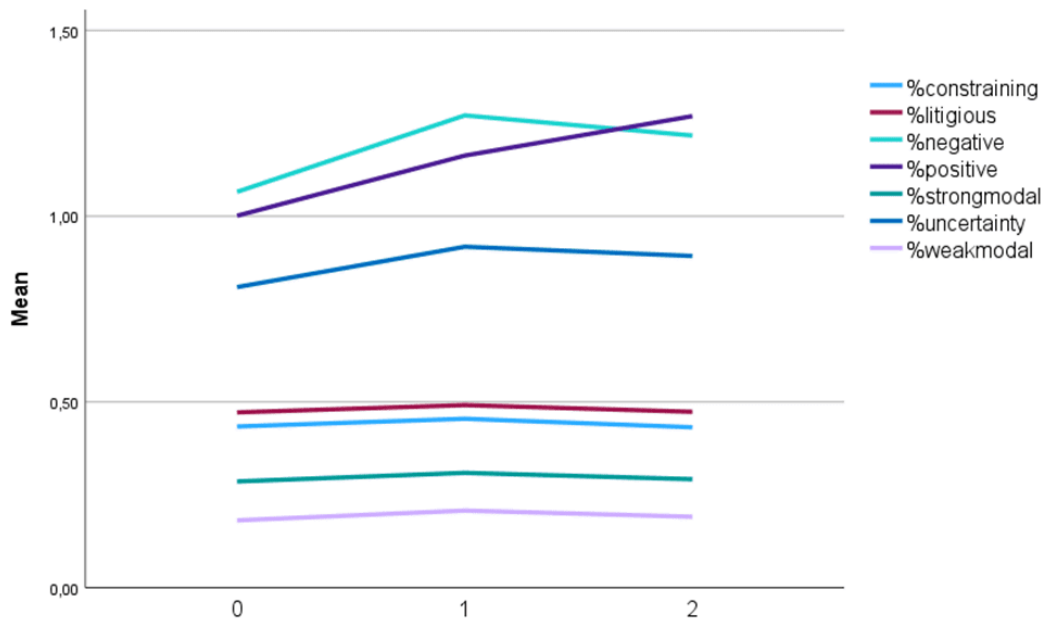
Figure 3. Narrative tone over the three periods

Figure 3 shows that narrative tone categories generally increased during the COVID-19 pandemic, reflecting the heightened challenges of the period. Constraining, negative, and uncertain words increased, indicating companies' cautious and restricted outlooks, while positive words also increased, suggesting balanced communication. After COVID-19, most categories decreased, reverting closer to pre-pandemic levels, except for positive words, which continued to rise, hinting at an optimistic shift in corporate tone after the pandemic.
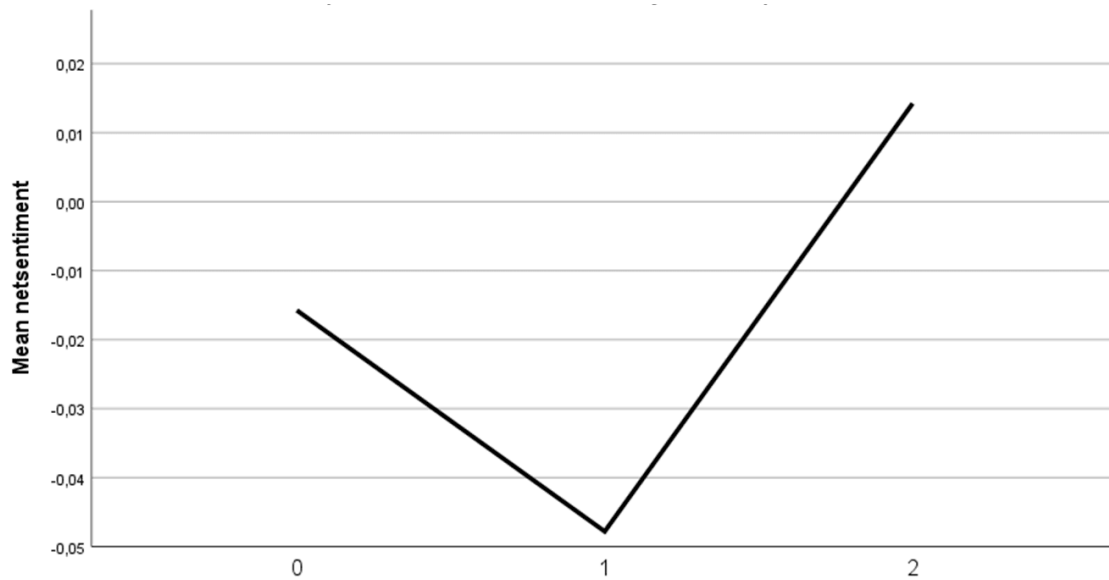
Figure 4. Net sentiment over the three periods

Figure 4 depicts the trend in the mean net sentiment across the three periods. Net sentiment, calculated as the difference between positive and negative word usage, showed a clear shift in tone over time. Before COVID-19, net sentiment was slightly negative, suggesting a slight predominance of negative over positive language. During COVID-19, net sentiment dropped further into a negative territory, reflecting a heightened use of negative language as companies communicated the challenges and uncertainties posed by the pandemic. This deep decline highlights a more pessimistic or cautious tone in corporate communication during a crisis. However, in the post-COVID-19 period, net sentiment improved significantly, rising to positive values. This upward shift indicates a reversal, with more positive than negative language being used, possibly signalling renewed optimism and a forward-looking outlook in corporate narratives. Thus, the graph captures a clear progression from a cautious tone before COVID-19 to a highly negative tone during the pandemic, followed by a more positive tone during the recovery period.

The descriptive statistics for the dataset are presented in Table 2.

Panel A: Before COVID-19 (2018 and 2019)					
Variable	Mean	Median	SD	Min	Max
Total Words Analysed	61 805	54 933	36 005	10 740	475 996
Flesch–Kincaid	14.948	14.900	0.988	8.800	19.000
Percentage constraining words	0.434	0.427	0.117	0.000	0.798
Percentage litigious words	0.472	0.361	0.915	0.000	20.044
Percentage negative words	1.065	0.891	0.991	0.000	17.512
Percentage positive words	1.001	0.881	0.582	0.000	3.374
Percentage strong modal words	0.286	0.266	0.150	0.000	1.604
Percentage uncertainty words	0.809	0.689	0.675	0.000	10.224
Percentage weak modal words	0.181	0.141	0.256	0.000	4.915
Net sentiment	–0.016	–0.009	0.262	–1.000	0.892
n = 547					
Panel B: During COVID-19 (2020 and 2021)					
Variable	Mean	Median	SD	Min	Max
Total Words Analysed	67 045	59 733	34 679	14 756	265 121
Flesch–Kincaid	15.047	15.000	0.946	7.500	18.200
Percentage constraining words	0.455	0.440	0.102	0.115	0.895
Percentage litigious words	0.491	0.380	0.550	0.022	6.905
Percentage negative words	1.271	1.117	0.836	0.082	7.376
Percentage positive words	1.163	1.042	0.666	0.089	3.752
Percentage strong modal words	0.309	0.292	0.143	0.008	0.980
Percentage uncertainty words	0.918	0.765	0.615	0.042	4.782
Percentage weak modal words	0.207	0.159	0.212	0.007	2.411
Net sentiment	–0.048	–0.044	0.242	–0.659	0.516

n = 472					
Panel C: After COVID-19 (2022 and 2023)					
Variable	Mean	Median	SD	Min	Max
Total Words Analysed	66 607	60 832	35 737	13 286	306 265
Flesch-Kincaid	12.718	11.900	2.465	5.900	19.000
Percentage constraining words	0.432	0.426	0.106	0.000	0.893
Percentage litigious words	0.473	0.381	0.444	0.000	5.509
Percentage negative words	1.217	1.083	0.852	0.000	8.850
Percentage positive words	1.269	1.132	0.741	0.000	4.871
Percentage strong modal words	0.292	0.264	0.143	0.000	1.108
Percentage uncertainty words	0.893	0.747	0.628	0.000	5.620
Percentage weak modal words	0.191	0.138	0.202	0.000	1.815
Net sentiment	0.014	0.023	0.248	−0.726	0.581
n = 462					

Table 2. Descriptive statistics

Source: Authors' compilation

The descriptive statistics revealed notable shifts in the language characteristics of integrated reports across the periods before, during, and after COVID-19. The average total word count increased during the pandemic, indicating more extensive communication, possibly in response to heightened information need. Readability scores remained relatively complex before and during COVID-19, but simplified after the pandemic, suggesting a shift toward a more accessible language post-crisis.

The use of constraining and litigious words remained relatively stable, with only slight increases during the COVID-19 pandemic, reflecting a period marked by restrictions and regulatory considerations. Notably, the percentage of negative words increased during the pandemic, which is consistent with the challenging

business environment, and remained high after COVID-19. Positive words, however, saw an uptick during and especially after COVID-19, hinting at a more optimistic narrative as companies moved toward recovery.

Uncertainty words peaked during the pandemic, aligning with the unpredictable business landscape, while strong modal words increased slightly, signalling a more assertive tone in communication. Weak modal words showed only minimal changes, reflecting careful communication, without excessive hedging. Net sentiment turned positive after COVID-19, following a negative trend before and during the pandemic, suggesting a shift to a more favourable tone post-crisis. These findings indicate an adaptive communication approach by companies that adjusts the tone, sentiment, and readability of reports in response to the evolving crisis.

The results of the Kruskal–Wallis test are shown in Table 3.

Variable	Kruskal–Wallis H	df	Asymp. Sig.
Total Words Analysed	11.578	2	**0.003*****
Flesch–Kincaid	238.759	2	**0.000*****
Percentage constraining words	11.231	2	**0.004*****
Percentage litigious words	4.172	2	0.124
Percentage negative words	40.739	2	**0.000*****
Percentage positive words	36.710	2	**0.000*****
Percentage strong modal words	9.409	2	**0.009*****
Percentage uncertainty words	15.366	2	**0.000*****
Percentage weak modal words	14.949	2	**0.001*****
Net sentiment	14.063	2	**0.001*****

Table 3. Kruskal–Wallis test results

The Kruskal-Wallis test results revealed significant changes in most language characteristics across the three periods—before, during, and after COVID-19—highlighting shifts in corporate communication as companies responded to and recovered from the pandemic's impact.

Report length increased significantly during the COVID-19 pandemic, likely due to companies' need to provide more comprehensive updates amid heightened uncertainty and stakeholder demand for transparency. Readability also showed significant changes, with reports becoming slightly more complex during the pandemic and then noticeably more accessible afterwards. This shift suggests that, while companies initially addressed complexities, they later adopted a simpler language to enhance stakeholder engagement during the recovery phase.

The use of constraining words increased significantly during the COVID-19 pandemic, reflecting the restrictions and operational limitations faced by companies, as they reported on constraints impacting their activities. Both negative and positive words saw significant changes: negative words increased during COVID-19, mirroring the challenging business environment, while positive words continued to rise post-pandemic, indicating a more optimistic outlook, as companies focused on recovery and growth.

Modal words also shifted, with strong modal words increasing slightly during the COVID-19 pandemic, likely reflecting a more assertive tone aimed at reassuring stakeholders. Weak modal words decreased after the pandemic, suggesting a shift toward more confident communication as uncertainty diminished. Uncertainty words spiked significantly during COVID-19, aligned with the unpredictable environment, and then declined in the post-pandemic period, indicating a return to more stable conditions.

Net sentiment was significantly lower during the COVID-19 pandemic because of the increased use of negative language, reflecting challenging circumstances. However, net sentiment improved to a positive value after COVID-19, signalling a more optimistic tone as companies looked toward recovery. Overall, these results illustrate how companies adapted their tone, readability, and sentiment in response to the evolving crisis, from the initial uncertainty of the pandemic to the gradual optimism of the recovery phase, aligning their communication with stakeholder needs across different phases of the crisis.

The Mann–Whitney U post hoc test results are presented in Table 4.

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Panel A: Before and during COVID-19				
Variable	**Mann–Whitney U**	**Wilcoxon W**	**Z**	**Asymp. Sig. (2–tailed)**
Total Words Analysed	114 489.5	264 367.5	–3.117	**0.002***
Flesch–Kincaid	119 296.5	269 174.5	–2.093	0.036
Percentage constraining words	117 094.0	266 972.0	–2.561	**0.010***
Percentage litigious words	120 312.5	270 190.5	–1.874	0.061
Percentage negative words	100 203.0	250 081.0	–6.167	**0.000***
Percentage positive words	111 021.5	260 899.5	–3.857	**0.000***
Percentage strong modal words	115 147.5	265 025.5	–2.977	**0.003***
Percentage uncertainty words	111 159.5	261 037.5	–3.828	**0.000***
Percentage weak modal words	111 654.0	261 532.0	–3.723	**0.000***
Net sentiment	120 103.0	231 731.0	–1.871	0.061
Panel B: During and after COVID-19				
Variable	**Mann–Whitney U**	**Wilcoxon W**	**Z**	**Asymp. Sig. (2–tailed)**
Total Words Analysed	107 885.5	214 838.5	–0.278	0.781
Flesch–Kincaid	52 720.5	159 673.5	–13.666	**0.000***
Percentage constraining words	95 865.0	202 818.0	–3.194	**0.001***
Percentage litigious words	108 067.0	215 020.0	–0.234	0.815
Percentage negative words	102 745.0	209 698.0	–1.525	0.127
Percentage positive words	100 294.5	211 922.5	–2.120	0.034
Percentage strong modal words	99 899.0	206 852.0	–2.216	0.027
Percentage uncertainty words	104 849.0	211 802.0	–1.015	0.310
Percentage weak modal words	97 307.0	204 260.0	–2.845	**0.004***
Net sentiment	93 193.0	204 821.0	–3.791	**0.000***

Panel C: Before and after COVID-19				
Variable	Mann–Whitney U	Wilcoxon W	Z	Asymp. Sig. (2–tailed)
Total Words Analysed	114 059.0	263 937.0	–2.667	**0.008***
Flesch–Kincaid	65 661.0	172 614.0	–13.166	**0.000***
Percentage constraining words	123 389.0	230 342.0	–0.644	0.520
Percentage litigious words	119 030.0	268 908.0	–1.589	0.112
Percentage negative words	106 134.0	256 012.0	–4.385	**0.000***
Percentage positive words	99 195.5	249 073.5	–5.889	**0.000***
Percentage strong modal words	123 764.0	273 642.0	–0.562	0.574
Percentage uncertainty words	114 329.0	264 207.0	–2.608	**0.009***
Percentage weak modal words	123 253.5	273 131.5	–0.673	0.501
Net sentiment	116 897.5	266 228.5	–1.948	0.051

Table 4. Mann–Whitney U test results

Note: The Mann–Whitney U test tests for differences in mean ranks across two groups. A significant Bonferroni-corrected significance threshold of ($\alpha_{adjusted}$ < 0.0167) indicates that the distribution of a variable is statistically different across the periods.

*** indicates statistical significance according to the Bonferroni–corrected significance level.

Source: Authors' compilation

Post-hoc Mann–Whitney U tests revealed significant differences across various language characteristics between the three periods (before, during, and after COVID-19), providing deeper insights into how corporate communication evolved in response to the pandemic. During the shift from the pre-pandemic to the pandemic period, several language characteristics changed significantly. The total number of words analysed increased, indicating that companies expanded their report length to provide more comprehensive information amid heightened uncertainty. The percentage of constraining and negative words also increased, reflecting the challenges and restrictions that companies faced during this period. Interestingly, positive words also saw a significant increase, suggesting an effort by companies to balance

the negative aspects with reassuring language, and perhaps to maintain stakeholder confidence. Additionally, the rise in strong modal and uncertainty words highlights a combination of assertiveness and acknowledgement of uncertainty, as companies are likely to seek to communicate both their resilience and the difficulties they experienced.

In the transition from COVID-19 to the post-pandemic period, some language characteristics began to revert closer to pre-COVID levels, while others adopted new patterns. The Flesch-Kincaid readability score dropped significantly, signalling a shift towards simpler, more accessible language, likely to enhance transparency and engagement. Constraining words decreased, indicating a reduction in language focused on limitations, as the business environment stabilized. Weak modal words decreased and net sentiment turned positive, reflecting a more confident and optimistic outlook as companies shifted away from the tentative language and adopted a more forward-looking tone.

A comparison of the pre- and post-pandemic periods revealed enduring changes. Report lengths remained significantly longer, suggesting that the expansion of reports during the pandemic may have set a new standard for comprehensiveness in corporate communications. Readability continued to improve, indicating a commitment to accessible language. Negative words significantly decreased, while positive words increased, underscoring a marked shift in sentiment from pre-pandemic negativity to post-pandemic optimism. Additionally, uncertainty words declined, indicating a return to stability and a reduced emphasis on unpredictability in the business environment.

These results collectively highlight the transformation in corporate communication practices throughout the pandemic and recovery phases. During the COVID-19 pandemic, companies adopted a balanced tone to communicate both challenges and reassurance. In the post-pandemic period, there was a noticeable shift towards accessibility, positivity, and confidence, reflecting an adaptation to the "new normal" and an effort to maintain stakeholder trust through transparent, optimistic language. This evolution suggests that companies responded to the pandemic by enhancing transparency, and have continued to adapt their tone and readability to align with the needs of stakeholders in the recovery phase.

The Kruskal-Wallis and Mann-Whitney U test results support all four hypotheses, indicating that the COVID-19 crisis significantly affected various aspects of integrated reports. H1, which proposes that the crisis affected the length of reports, is accepted based on significant differences in word count across periods, with reports becoming longer during and after the pandemic. H2, suggesting that readability was affected, is also accepted, as readability scores varied significantly, with reports becoming more complex during COVID-19 and simpler afterwards. H3 regarding changes in tone is confirmed by significant

differences in the use of constraining, negative, positive, strong modal, uncertainty, and weak modal words across periods, reflecting shifts in language tone during the crisis. Finally, H4, which proposes an effect on net sentiment, is accepted, as net sentiment was significantly lower during COVID-19 but turned positive in the post-pandemic period. Collectively, these results demonstrate that the COVID-19 crisis influenced report length, readability, tone, and net sentiment, reflecting an adaptive approach to corporate communication in response to this evolving situation.

5. Conclusions, implications, limitations, and suggestions for future research

This study sheds light on how South African companies have adapted the language and content of their integrated reports across three critical phases: before, during, and after the COVID-19 pandemic. These shifts, notably in report length, readability, narrative tone, and net sentiment, reflect strategic responses to the pandemic's unique challenges. The findings support stakeholder theory, as the increased report length and transition to more accessible language post-pandemic appear to be deliberate efforts by companies to address evolving stakeholder needs, thus maintaining credibility and trust during uncertain times[28][27]. By adapting their communication style, organisations effectively demonstrate commitment to stakeholder engagement and responsiveness, which are the core principles of stakeholder theory. This aligns with research that views report length as a mechanism for enhancing transparency[34], suggesting that companies seek to meet stakeholder demands for comprehensive, understandable information, especially amid heightened uncertainty.

This study also aligns with impression management theory, where the observed changes in language tone and sentiment reflect strategic efforts to influence stakeholder perceptions. The increase in positive language and net sentiment in reports after COVID-19, along with a reduction in negative and uncertain words, suggests that companies were actively managing their image to foster confidence and convey resilience. This balancing act of positive and negative tones during COVID-19 reveals an impression management strategy in which companies seek to reassure stakeholders while acknowledging the challenges they face. This approach is consistent with the impression management tactics observed in prior studies, wherein companies use both positive and balanced language to shape perceptions favourably, especially during times of crisis[30][31]. By tailoring language to manage impressions, companies demonstrated a careful balance between realism and optimism, aimed at maintaining a favourable reputation amid the complexities of the pandemic[33]. The findings of this research partially

align with the earlier results of Esterhuyse and du Toit[24], who examined shareholder letters in 2020 and found elevated use of tentative language and emotional tone. The extended analysis across three periods confirms and extends these insights by showing that such patterns were concentrated during the pandemic and later diminished.

This study makes important contributions to the literature on crisis communication, particularly in the context of emerging markets. Academically, this enhances our understanding of how companies leverage language in integrated reports to adapt to stakeholder needs and manage perceptions during crises. The findings underscore that language adjustments are not merely reactive, but are strategically employed to foster credibility and manage impressions. Practically, this study offers insights for corporate leaders and communication teams, suggesting that stakeholders value transparency and optimism during crises. By balancing transparency with positive narratives, companies can effectively bolster resilience and maintain stakeholder trust even in turbulent periods, thereby improving integrated reporting practices.

This study is limited to South African companies listed on the JSE, meaning that the results may differ in other contexts, with varying cultural and economic factors. Future research could explore whether similar trends are evident in integrated reports from other emerging and developed economies to provide valuable comparative insights. Additionally, although this study focused on readability, tone, and sentiment, further research could examine the impact of visual content and specific thematic shifts in reports over time. Analysing investor and stakeholder reactions to these linguistic strategies could further illuminate the effectiveness of these adaptive approaches, particularly in enhancing credibility and maintaining favourable perceptions during and after crises.

Statements and Declarations

Conflicts of interest

All authors declare that they have no conflicts of interest to disclose.

References

1. ^Al Amosh H, Khatib SF (2023). "COVID-19 impact, financial and ESG performance: Evidence from G 20 count ries." Bus Strateg Dev. 6(3):310–321. doi:10.1002/bsd2.240.

2. ^Elmarzouky M, Albitar K, Karim AE, Moussa AS (2021). "COVID-19 disclosure: a novel measurement and an nual report uncertainty." J Risk Financ Manag. 14(12):616. doi:10.3390/jrfm14120616.

3. [a, b, c]*Fassas A, Bellos S, Kladakis G (2021). "Corporate liquidity, supply chain and cost issues awareness within the Covid-19 context: evidence from us management reports' textual analysis." Corp Gov Int J Bus Soc. 21(6):1155–1171. doi:10.1108/CG-09-2020-0399.*

4. [^]*Oum S, Kates J, Wexler A (2022). "Economic impact of COVID-19 on PEPFAR countries." KFF. https://www.kff.org/global-health-policy/issue-brief/economic-impact-of-covid-19-on-pepfar-countries/.*

5. [a, b, c, d]*Alshorman S, Shanahan M (2022). "The voice of profit: exploring the tone of Australian CEO's letters to shareholders after the global financial crisis." Corp Commun Int J. 27(1):127–147. doi:10.1108/CCIJ-12-2020-0169.*

6. [a, b, c, d, e, f, g]*Hassan MK, Abu-Abbas B, Kamel H (2022). "Tone, readability and financial risk: the case of GCC banks." J Account Emerg Econ. 12(4):716–740. doi:10.1108/JAEE-06-2021-0192.*

7. [a, b, c]*Li S, Wang G, Luo Y (2022). "Tone of language, financial disclosure, and earnings management: a textual analysis of form 20-F." Financ Innov. 8(1). doi:10.1186/s40854-022-00346-5.*

8. [a, b, c]*Moreno A, Jones MJ (2021). "Impression management in corporate annual reports during the global financial crisis." Eur Manag J. 40(4):503–517. doi:10.1016/j.emj.2021.08.007.*

9. [a, b]*Poole R (2016). "Good times, bad times: A keyword analysis of letters to shareholders of two Fortune 500 banking institutions." Int J Bus Commun. 53(1):55–73. doi:10.1177/2329488414525449.*

10. [a, b]*Scheuerlein J, Chládková H (2022). "Leadership and effectiveness: a content analysis of letters to shareholders during the financial crisis." Int J Bus Commun. 59(3):385–405. doi:10.1177/2329488418804044.*

11. [a, b]*Caserio C, Panaro D, Trucco S (2020). "Management discussion and analysis: a tone analysis on US financial listed companies." Manag Decis. 58(3):510–525. doi:10.1108/MD-10-2018-1155.*

12. [a, b]*Chakraborty B, Bhattacharjee T (2020). "A review on textual analysis of corporate disclosure according to the evolution of different automated methods." J Financ Rep Account. 18(4):757–777. doi:10.1108/JFRA-02-2020-0047.*

13. [a, b, c]*Nel GF, Arendse-Fourie S-L, Ontong JM (2022). "The association between optimism and future performance: Evidence of impression management from chief executive officer and chairperson letters." S Afr J Bus Manag. 53(1):12. doi:10.4102/sajbm.v53i1.3183.*

14. [a, b, c, d]*Rich KT, Roberts BL, Zhang JX (2021). "Linguistic tone of management discussion and analysis disclosures and the municipal debt market." J Public Budget Account Financ Manag. 33(4):427–446. doi:10.1108/JPBAFM-11-2019-0168.*

15. [^]*Smith M, Dong Y, Ren Y (2011). "The predictive ability of corporate narrative disclosures: Australian evidence." Asian Rev Account. doi:10.1108/13217341111181087.*

16. ^*Tailab MM, BenYoussef N, Al-Okaily J (2023). "Firm performance as a mediator of the relationship between CEO narcissism and positive rhetorical tone." J Financ Rep Account. doi:10.1108/JFRA-06-2022-0224.*

17. a, b*Zharfpeykan R, Ng F (2021). "COVID-19 and sustainability reporting: what are the roles of reporting frame works in a crisis?" Pac Account Rev. 33(2):189–198. doi:10.1108/PAR-09-2020-0169.*

18. a, b, c, d, e*Alduais F, Nashat Ali A, Samara A, Masadeh A (2022). "Conciseness, Financial Disclosure, and Marke t Reaction: A Textual Analysis of Annual Reports in Listed Chinese Companies." Int J Financ Stud. 10(4):104. d oi:10.3390/ijfs10040104.*

19. a, b, c, d*Alduais F (2022). "Textual analysis of the annual report and corporate performance: evidence from C hina." J Financ Rep Account. doi:10.1108/JFRA-04-2022-0129.*

20. ^*Rutherford BA (2003). "Obfuscation, textual complexity and the role of regulated narrative accounting discl osure in corporate governance." J Manag Gov. 7(2):187–210.*

21. a, b, c*Alshorman S, Shanahan M (2021). ""Look on the bright side": CEO optimism and firms' market valuatio n." Pac Account Rev. 33(3):274–300. doi:10.1108/PAR-04-2020-0041.*

22. ^*Clatworthy MA, Jones MJ (2006). "Differential patterns of textual characteristics and company performanc e in the chairman's statement." Account Audit Account J. 19(4):493–511. doi:10.1108/09513570610679100.*

23. ^*Nadkarni S, Barr PS (2008). "Environmental context, managerial cognition, and strategic action: An integra ted view." Strateg Manag J. 29(13):1395–1427. doi:10.1002/smj.717.*

24. a, b, c*Esterhuyse, L., & Du Toit, E. (2024). Making sense of letters to shareholders during the Covid-19 crisis: Th e effect of readability, tones and sentiment. SAIMS 35th Annual Conference Proceedings, 8–11 September 202 4, Stellenbosch, South Africa.*

25. ^*Brennan NM, Guillamon-Saorin E, Pierce A (2009). "Methodological Insights: Impression management: dev eloping and illustrating a scheme of analysis for narrative disclosures—a methodological note." Account Audi t Account J. 22(5):789–832. doi:10.1108/09513570910966379.*

26. a, b*Skinner AN (2024). "Subject matter complexity and disclosure channel richness." Account Rev. 1–33. doi:10. 2308/TAR-2021-0337.*

27. a, b, c*Freeman R (1984). Strategic management: a stakeholder approach. Pitman.*

28. a, b*Donaldson T, Preston LE (1995). "The stakeholder theory of the corporation: Concepts, evidence, and impli cations." Acad Manag Rev. 20(1):65–91.*

29. ^*Freeman RE, Harrison JS, Wicks AC (2007). Managing for stakeholders: Survival, reputation, and success. Yal e University Press.*

30. a, b*Goffman E (1949). "Presentation of self in everyday life." Am J Sociol. 55(1):6–7.*

31. <u>a</u>, <u>b</u>, <u>c</u>*Merkl-Davies DM, Brennan NM (2007). "Discretionary disclosure strategies in corporate narratives: incr emental information or impression management?" J Account Lit. 27(1):116–196.*

32. <u>∧</u>*Schlenker BR (1980). Impression management. Monterey, CA: Brooks/Cole. Vol. 526.*

33. <u>a</u>, <u>b</u>*Brennan NM, Merkl-Davies DM (2013). "Accounting narratives and impression management." In The Rout ledge companion to accounting communication. Routledge. p. 109–132.*

34. <u>a</u>, <u>b</u>*Beattie V, McInnes B, Fearnley S (2004). "A methodology for analysing and evaluating narratives in annu al reports: a comprehensive descriptive profile and metrics for disclosure quality attributes." Account Forum.*

35. <u>a</u>, <u>b</u>, <u>c</u>*Li F (2008). "Annual report readability, current earnings, and earnings persistence." J Account Econ. 45 (2):221–247. doi:<u>10.1016/j.jacceco.2008.02.003</u>.*

36. <u>a</u>, <u>b</u>*Loughran T, McDonald B (2014). "Measuring readability in financial disclosures." J Finance. 69(4):1643–16 71. doi:<u>10.1111/jofi.12162</u>.*

37. <u>∧</u>*You H, Zhang X-j (2009). "Financial reporting complexity and investor underreaction to 10-K information." Rev Account Stud. 14:559–586.*

38. <u>a</u>, <u>b</u>*Efretuei E, Hussainey K (2022). "The fog index in accounting research: contributions and challenges." J Ap pl Account Res. 24(2):318–343. doi:<u>10.1108/JAAR-09-2021-0243</u>.*

39. <u>∧</u>*Davis AK, Tama-Sweet I (2012). "Managers' use of language across alternative disclosure outlets: Earnings p ress releases versus MD&A." Contemp Account Res. 29(3):804–837. doi:<u>10.1111/j.1911-3846.2011.01125.x</u>.*

40. <u>∧</u>*Del Gaudio BL, Megaravalli AV, Sampagnaro G, Verdoliva V (2020). "Mandatory disclosure tone and bank ri sk-taking: Evidence from Europe." Econ Lett. 186:108531. doi:<u>10.1016/j.econlet.2019.108531</u>.*

41. <u>a</u>, <u>b</u>, <u>c</u>*Huang X, Teoh SH, Zhang Y (2014). "Tone management." Account Rev. 89(3):1083–1113. doi:<u>10.2308/accr-50684</u>.*

42. <u>a</u>, <u>b</u>, <u>c</u>, <u>d</u>*Loughran T, McDonald B (2011). "When is a liability not a liability? Textual analysis, dictionaries, and 10-Ks." J Finance. 66(1):35–65.*

43. <u>a</u>, <u>b</u>*Loughran T, McDonald B (2015). "The use of word lists in textual analysis." J Behav Finance. 16(1):1–11.*

44. <u>∧</u>*Luo Y, Zhou L (2020). "Textual tone in corporate financial disclosures: a survey of the literature." Int J Disclo s Gov. 17(2-3):101–110. doi:<u>10.1057/s41310-020-00077-y</u>.*

45. <u>∧</u>*Tran LTH, Tu TTK, Nguyen TTH, Nguyen HTL, Vo XV (2021). "Annual report narrative disclosures, informati on asymmetry and future firm performance: evidence from Vietnam." Int J Emerg Mark. 18(2):351–375. doi:<u>1 0.1108/IJOEM-08-2020-0925</u>.*

46. <u>a</u>, <u>b</u>*Arslan-Ayaydin Ö, Boudt K, Thewissen J (2016). "Managers set the tone: Equity incentives and the tone of earnings press releases." J Bank Finance. 72:S132–S147.*

47. [a], [b], [c]*Boudt K, Thewissen J (2019). "Jockeying for position in CEO letters: Impression management and sentiment analytics." Financ Manag. **48**(1):77–115. doi:10.1111/fima.12219.*

48. [^]*Clatworthy M, Jones MJ (2003). "Financial reporting of good news and bad news: evidence from accounting narratives." Account Bus Res. **33**(3):171–185. doi:10.1080/00014788.2003.9729645.*

49. [^]*Martikainen M, Miihkinen A, Watson L (2023). "Board characteristics and negative disclosure tone." J Account Lit. **45**(1):100–129. doi:10.1108/JAL-03-2022-0033.*

50. [^]*Rahman S (2023). "Narrative tone and earnings persistence." J Int Account Audit Tax. **52**:100562. doi:10.1016/j.intaccaudtax.2023.100562.*

51. [^]*Du S, Yu K (2021). "Do corporate social responsibility reports convey value relevant information? Evidence from report readability and tone." J Bus Ethics. **172**:253–274. doi:10.1007/s10551-020-04496-3.*

Declarations