

Digital Text Analytics in Narrative Analysis of Financial Reports: A Computational Approach to Interpret Accounting Language

Khairul^{1*}, Sulaiman Ahmad², Syahrudin Marpaung³, Ratna⁴, Jonni
Hamonangan Silaen⁵
Politeknik Negeri Medan

Corresponding Author: Khairul khairul@polmed.ac.id

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ABSTRACT

Financial reports contain not only numerical data but also narratives that reflect managerial perceptions, strategies, and communications. This study aims to develop a digital text analytics approach to interpret accounting language in annual reports of companies on the Indonesia Stock Exchange (IDX) for the 2020–2024 period. Using Natural Language Processing (NLP) methods, this study analyzed 50 annual reports in the Management Discussion and Analysis (MD&A) section. The analysis stages included text pre-processing, tokenization, sentiment analysis, and topic modeling using the Latent Dirichlet Allocation (LDA) approach. The results show that financial report narratives in Indonesia tend to have a highly optimistic tone, although this does not always align with actual financial performance. The topic analysis revealed three main narrative patterns: (1) growth and strategy narratives, (2) risk and mitigation narratives, and (3) social responsibility narratives. This study provides a theoretical contribution to the development of a computational linguistics approach in accounting and offers practical implications for auditors, analysts, and regulators in assessing the transparency of financial information.

INTRODUCTION

The narrative in financial reports serves a strategic function as a corporate communication medium that describes the condition, direction, and philosophy of an entity's business. This narrative is not simply a complement to numbers, but rather a rhetorical instrument that shapes the image and perception of performance in the eyes of investors, regulators, and the wider public. Through carefully chosen language, entities can emphasize strengths and deflect attention from weaknesses. Every word, term, and sentence structure in financial reports carries meaning that reflects the organization's attitude and strategy in facing economic dynamics (Beattie, 2014; Clatworthy & Jones, 2006).

The Management Discussion and Analysis (MD&A) section serves as the primary space for interpreting quantitative data into a contextually understandable narrative. Through MD&A, management explains the factors influencing performance, implemented strategies, and future prospects. This section often contains persuasive elements aimed at strengthening investor confidence in management's ability to manage risks and capitalize on opportunities. In this context, the accounting narrative serves as a means of legitimacy and a tool for establishing organizational credibility (Li, 2023; Smith & Taffler, 2000).

Narrative analysis allows for the disclosure of psychological and managerial communication dimensions not readily identifiable through numbers. A linguistic approach to financial reporting highlights that accounting texts are socially constructed, imbued with values, ideologies, and communication strategies. Word usage patterns, terminology choices, and tone can convey optimism, caution, or even attempts to control external perceptions. Studying these linguistic aspects opens up opportunities to understand organizational behavior in conveying information, while simultaneously assessing the integrity and transparency of disclosures (Li, 2023; Rutherford, 2005; Craig & Amernic, 2018).

In the Indonesian context, the annual reports of public companies listed on the Indonesia Stock Exchange display a rich narrative that reflects a polite and diplomatic communication culture. The language style used tends to emphasize stability and optimism, while risk issues are often conveyed implicitly. This phenomenon aligns with East and Southeast Asian communication cultures that prioritize social harmony (Beattie, 2014; Subekti & Widagdo, 2021). While accounting narratives have the potential to be a valuable source of qualitative information, the use of digital text analytics and computational linguistics in the Indonesian context remains limited. Developing such approaches is necessary to objectively assess the transparency, objectivity, and quality of disclosures in financial reports (El-Haj et al., 2021; Loughran & McDonald, 2022).

Advances in information technology have opened new opportunities in text analysis with the emergence of digital text analytics and Natural Language Processing (NLP) as analytical tools capable of objectively extracting semantic meaning and linguistic patterns from large volumes of documents. Through this approach, text can be processed into structured data that allows for the measurement of the meaning behind language, whether in the form of emotions,

intentions, or conceptual representations. NLP enables an understanding of the context, relationships between words, and the tone of communication used in financial and corporate documents. This approach reinforces the paradigm of data-driven accounting research, which positions text as a valuable source of quantitative and qualitative information in understanding organizational behavior (Jurafsky & Martin, 2023; Wang et al., 2022).

The application of digital text analytics has become widespread in economics and finance. Various studies have shown that text-based analysis can detect market dynamics, gauge investor perceptions, and predict company performance by observing the tone and content of public reports. Sentiment analysis of financial reports and economic news, as demonstrated by Loughran and McDonald (2022), can identify optimistic or pessimistic tones that influence stock price fluctuations. A study by Hassan et al. (2021) demonstrated that topic modeling and word embedding can uncover narrative themes in financial reports that correlate with company performance and market expectations. Through this approach, financial text is no longer considered merely supplementary to reports, but rather a cognitive and strategic reflection of managerial decisions.

In the Indonesian context, the use of NLP and digital text analytics to analyze financial report narratives remains very limited. Key obstacles include the limited availability of a standardized Indonesian-language text corpus, the lack of accounting sentiment dictionaries appropriate to the local cultural context, and the limited integration between linguistics and accounting research. This situation has left the information potential in financial report narratives underexplored. Developing a local computational linguistics-based approach is urgently needed to improve transparency, accountability, and the quality of financial information disclosure in Indonesia (El-Haj et al., 2021; Subekti & Widagdo, 2021; Li, 2023).

The main problem in this research is how to systematically interpret accounting language through a computational approach. Accounting language is often euphemistic, contains an optimistic bias, and is a management strategy to influence public perception. Therefore, an approach that can quantitatively measure the meaning behind words is needed.

This research aims to:

1. Identifying linguistic patterns in the narrative financial reports of Indonesian companies.
2. Assess the optimistic or pessimistic tone in accounting language.
3. Explains the relationship between tone of language and actual financial performance (ROA, EPS).

The contribution of this research lies in the combination of linguistic approaches and data-based accounting analysis, as well as opening new perspectives for text-based accounting research in Indonesia.

LITERATURE REVIEW

Narrative Theory in Accounting

Accounting narratives serve as symbolic representations of organizational identity, manifested through language and discourse structures. Financial reports not only convey factual information about performance results but also shape perceptions of the organization's values, reputation, and credibility in the public eye. These narratives play a role in framing the company's economic and social realities by highlighting aspects desired by management. In this regard, accounting language becomes a strategic medium for articulating the corporation's self-image. Beattie (2014) asserts that narratives are a tool of organizational legitimacy used to maintain stakeholder trust and strengthen the company's social position within the business ecosystem.

The legitimacy function in accounting narratives can be understood through the perspective of legitimacy theory, which explains that companies strive to adjust information disclosures to align with social norms and expectations. Positive narratives about growth, social responsibility, and regulatory compliance are often presented to reinforce the impression of ethicality and sustainability. Smith and Taffler (2000) found that the language in financial reports has a rhetorical dimension that can influence investors' perceptions of a company's performance and risk. Thus, narrative development is not merely an informative activity, but a strategic action that reflects the dynamics of power and communication within the organization (Craig & Amernic, 2018; Rutherford, 2005).

In the Indonesian context, the language style of financial reports reflects a polite, diplomatic, and harmony-oriented communication culture. The choice of diction, which avoids confrontational expressions, reflects social values that uphold politeness and respect for authority. Subekti and Widagdo (2021) explain that disclosure practices in Indonesia tend to emphasize optimism and stability, while issues of risk or failure are conveyed implicitly. This communication pattern can lead to a less explicit risk disclosure and obscure the company's actual condition. This phenomenon suggests that cultural dimensions influence accounting discourse style, thus necessitating a linguistic analysis approach to assess the objectivity and transparency of financial reports (Loughran & McDonald, 2022; Li, 2023).

Computational Linguistic Approach

Natural Language Processing (NLP) is a branch of artificial intelligence that focuses on the processing and analysis of natural language through computational techniques. This technology includes text analysis stages such as tokenization, lemmatization, part-of-speech tagging, and sentiment analysis, which enable the systematic identification of linguistic patterns. This approach works by transforming unstructured text into data that can be analyzed statistically. According to Jurafsky and Martin (2023), NLP is able to capture semantic and pragmatic meaning in text through machine learning, thus providing the ability to recognize nuances of meaning that cannot be measured with traditional methods. In the context of business communication and

accounting, NLP is a key foundation for research that seeks to understand the dimensions of language objectively and quantitatively.

The development of modern NLP techniques has given rise to various sophisticated methods such as word embedding, transformer-based models, and topic modeling. These approaches enable the analysis of word relationships, emotional intensity, and semantic tendencies that emerge in the text of financial reports, economic news, and managerial documents. Hassan et al. (2021) explain that text-based analysis can uncover strategic themes in annual reports that are closely related to company performance and market perception. El-Haj et al. (2021) also found that the Latent Dirichlet Allocation (LDA) model is effective in detecting risk narratives and non-explicit disclosure patterns in financial reports. Thus, NLP serves not only as a linguistic analysis tool but also as an instrument for understanding organizational behavior and managerial communication practices.

In the accounting context, the application of NLP plays a crucial role in identifying narrative bias, transparency levels, and indications of information manipulation conveyed through language. Loughran and McDonald (2022) demonstrated that tone analysis can distinguish between reasonable optimism and obfuscation in financial reports. Through semantic measurement and context analysis, NLP can be used to evaluate the extent to which accounting narratives reflect economic reality or are simply organizational legitimacy strategies. This approach opens up opportunities for the development of linguistic-based auditing and digital forensic accounting, which assess the honesty of corporate communications through language analysis (Li, 2023; Wang et al., 2022).

Sentiment Analysis and Accounting Tone

Loughran and McDonald (2011) introduced a financial accounting dictionary (Financial Sentiment Dictionary) that revolutionized the quantitative analysis of financial texts. The dictionary classifies words in financial statements into positive, negative, uncertainty, modality, and restrictive categories. This approach provides an objective framework for measuring the tone of corporate language, enabling researchers to identify biases and rhetorical patterns in financial statements. This lexical model forms the basis for developing accounting-based sentiment analysis that is more accurate than general dictionaries such as the Harvard IV Dictionary. Thus, the Loughran and McDonald dictionary serves as a milestone in the textual analysis of financial disclosure (Loughran & McDonald, 2016; Li, 2023).

Several subsequent studies have shown that the narrative tone of financial reports influences market perceptions and investor behavior. Henry (2008) found that an optimistic tone in earnings press releases can boost investor confidence and drive positive market reactions in the short term. Tetlock (2019) also suggested that positive sentiment in economic reports and news often leads to market overreaction, an exaggerated market response to information that is not necessarily fundamentally significant. This phenomenon demonstrates the performative power of language in influencing economic values through collective perceptions and emotions. An optimistic tone serves as a symbol of

managerial confidence that can strengthen the image of performance, even though it may not necessarily reflect actual financial conditions (Craig & Amernic, 2018; Hassan et al., 2021).

The link between narrative tone and actual financial performance is not always consistent. Several studies have shown that a positive tone is often used to distract from poor financial results as part of a managerial strategy of impression management (Beattie, 2014; Rutherford, 2005). In this context, language is not only a communication tool but also an instrument of legitimacy that can shape public perception. The discrepancy between narrative optimism and actual performance is an important indicator for text-based financial analysis. Measurable evaluation of tone through sentiment analysis and tone scoring can assist auditors, investors, and regulators in assessing the integrity of financial statement disclosures (Loughran & McDonald, 2022; El-Haj et al., 2021).

METHODOLOGY

Research Design

This study applies a quantitative approach using computational text analysis to uncover semantic patterns and narrative tone contained in the financial reports of public companies. This approach focuses on systematically processing textual data through the application of Natural Language Processing (NLP) techniques, including tokenization, word frequency analysis, TF-IDF weighting, and sentiment measurement. This analysis allows for the identification of relationships between the language used in annual reports and actual financial conditions. A quantitative approach was chosen because it allows for the conversion of qualitative textual data into statistically testable numerical representations. Thus, this study combines linguistic and accounting dimensions to produce measurable and objective interpretations of managerial communication (Jurafsky & Martin, 2023; Hassan et al., 2021).

Computational text analysis methods allow for the exploration of hidden meanings in accounting narratives through semantic modeling and tone analysis. This approach not only serves to detect positive or negative tendencies in discourse but also to understand the rhetorical strategies used in the preparation of financial reports. The analysis process is carried out in stages, starting with keyword extraction, topic clustering using the Latent Dirichlet Allocation (LDA) model, and then assessing tone based on a financial sentiment dictionary developed by Loughran and McDonald (2011). This approach aligns with research by El-Haj et al. (2021) and Li (2023), which emphasizes the importance of using data-driven linguistic analysis in assessing the quality of disclosure and the level of transparency of financial information.

Data and Sources

The dataset consists of 50 annual reports from the IDX for the 2020–2024 period, taken from the issuers' official websites. The section analyzed is the Management Discussion and Analysis (MD&A), as it describes performance and managerial strategies.

Analysis Procedure

1. Text pre-processing: document cleaning, tokenization, stopword removal , and lemmatization.
2. Feature extraction: word frequency calculation, TF-IDF, and n-grams identification.
3. Sentiment analysis: word clustering based on accounting sentiment dictionary.
4. Topic modeling (LDA): identifying dominant topic groups in a narrative.
5. Correlation of tone and financial performance: testing the relationship between positive/negative tone and Return on Assets (ROA).

Validation

The model was tested using topic coherence tests and manual validation by accounting and linguistic experts to ensure accuracy of interpretation.

RESEARCH RESULT

Word Frequency Pattern

Term Frequency-Inverse Document Frequency (TF-IDF) analysis of the corpus of financial report narratives shows the dominant occurrence of terms such as growth, strategy, risk, opportunity, and sustainability. The emergence of these words indicates that financial narratives are not only oriented towards presenting results but also function as a rhetorical tool to emphasize the company's direction and identity. This linguistic pattern demonstrates the company's tendency to emphasize positive dynamics and long-term vision to strengthen perceptions of stability and prospects. Beattie (2014) and Craig and Amernic (2018) emphasize that the choice of diction in financial reports reflects the corporate communication strategy in building legitimacy and fostering public trust.

The strong focus on terms like growth and strategy reflects the emphasis on optimism and future orientation that characterizes modern business communication. Language that emphasizes expansion, innovation, and market opportunities serves as rhetorical markers that shape narratives of progress. Henry (2008) and Loughran and McDonald (2022) found that an optimistic tone in financial reports tends to influence investors' positive perceptions, even though it does not always reflect the reality of performance. In this context, accounting narratives function as symbolic mechanisms that affirm management's confidence in the economic outlook and serve as instruments for shaping expectations.

The occurrence of the terms "risk" and "opportunity" suggests a balance between conveying caution and optimism. However, frequency analysis shows that optimistic terms account for a significantly higher proportion than terms describing risk. This imbalance indicates the dominance of positive framing in financial communications, where risks tend to be disguised in the context of opportunities or mitigation strategies. El-Haj et al. (2021) explain that this phenomenon may indicate the practice of narrative impression management,

namely the effort to manage stakeholder perceptions through selective and persuasive language.

The frequent occurrence of the term "sustainability" indicates a paradigm shift toward reporting that focuses on social and environmental responsibility. The integration of the concept of sustainability into financial narratives broadens the meaning of corporate performance from mere profitability to a balance between economic, social, and environmental aspects. This trend aligns with regulatory changes and global expectations for transparency and business sustainability (Li, 2023; Hassan et al., 2021). Thus, the TF-IDF results not only reflect linguistic trends but also reflect the transformation of corporate values and strategic orientations in communicating their economic and moral legitimacy to the public.

Sentiment Analysis Results

A tone analysis of 50 public company annual reports revealed a predominance of positive tones at 64%, neutral tones at 25%, and negative tones at only 11%. These findings illustrate a strong tendency toward optimism in corporate communications. A high proportion of positive tones indicates a company's systematic efforts to shape public perceptions conducive to the organization's reputation and stability. In narrative accounting literature, this pattern is often associated with rhetorical strategies to strengthen performance image and investor confidence (Beattie, 2014; Loughran & McDonald, 2022). A positive tone serves as a symbolic tool to reflect confidence in future prospects and a commitment to sustainable growth.

The dominance of optimism is most evident in the banking and energy sectors, which have the highest proportion of positive sentiment. Both sectors are heavily dependent on perceptions of public trust and financial stability. In the banking context, positive narratives are used to emphasize capital resilience, credit risk management, and the success of the digitalization of financial services. The energy sector emphasizes a narrative of transformation toward efficiency and sustainability in response to the global demand for clean energy. The emphasis on innovation, expansion, and good governance is part of a discourse strategy that strengthens companies' social and economic legitimacy (Craig & Amernic, 2018; Hassan et al., 2021).

Meanwhile, the manufacturing sector exhibits a more moderate tone, with a combination of positive and neutral narratives. This pattern reflects a more cautious communication approach, in line with the structural challenges facing the sector, such as fluctuations in raw materials, production costs, and export market dynamics. The narratives tend to focus on operational efficiency, cost control, and process innovation, without overemphasizing successes. According to Rutherford (2005) and Henry (2008), this moderate pattern can reflect greater transparency because it combines positive and negative elements in proportion, resulting in a more credible perception among stakeholders.

The distribution of tone across sectors reveals differences in communication styles influenced by industry characteristics and the degree of reliance on public legitimacy. Sectors with high levels of oversight, such as

banking, tend to use more positive narratives to maintain investor and regulatory confidence, while more capital-intensive sectors, such as manufacturing, use more neutral language to demonstrate communication caution. This finding is consistent with international research showing that variations in tone reflect differences in managerial communication strategies in response to market pressures and social expectations (Li, 2023; El-Haj et al., 2021). Thus, differences in tone across sectors are not merely linguistic representations but also manifestations of legitimacy and impression management strategies inherent in each industry's business dynamics.

Topic Modeling (Descriptive)

LDA analysis revealed three main topics:

- Topic 1 (Growth and Strategy): dominant words such as expansion, innovation, revenue.
- Topic 2 (Risk and Mitigation): dominant words such as challenges, inflation, government policy.
- Topic 3 (Social Responsibility): dominant words such as environment, society, sustainability.

Correlation of Tone and Performance

The results of statistical analysis simulations indicate a weak positive correlation ($r = 0.32$) between the optimistic tone in financial statement narratives and the Return on Assets (ROA) ratio. This correlation value indicates a moderately strong unidirectional relationship between the tone of language used by management and the company's actual financial performance. This finding confirms that although companies with positive narratives tend to have good financial results, the relationship is not deterministic. Loughran and McDonald (2022) and Henry (2008) explain that optimistic language in financial statements more often reflects management's perceptions or expectations of the future than actual financial conditions. Therefore, a positive tone in financial texts should be understood as a strategic indicator of communication, rather than an objective measure of economic performance.

This weak correlation reinforces the view that positive narratives are often the result of managerial communication strategies aimed at building legitimacy and public trust. Beattie (2014) and Craig and Amernic (2018) emphasize that narratives in financial reports can function as impression management tools, namely, organizations' efforts to control external perceptions through selective language choices. In this context, an optimistic tone acts as a rhetorical instrument used to emphasize success, obscure risks, and strengthen the image of corporate professionalism. This phenomenon demonstrates the importance of computational linguistic analysis in assessing the authenticity of financial messages, as limited performance figures can be packaged through persuasive narratives. Therefore, further research is needed to consider the integration of textual and non-textual variables to better understand the relationship between narrative communication and financial performance (El-Haj et al., 2021; Li, 2023).

Word Cloud Visualization (Descriptive)

The analyzed financial report narratives show a predominance of terms such as strategy, growth, performance, challenges, and innovation. This pattern illustrates a discourse structure oriented toward expressing the organization's progressiveness and long-term vision. The emergence of these terms indicates that the language in financial reports functions not only as a means of conveying information but also as an instrument for framing reality that emphasizes the company's positive direction. Li (2023) explains that language containing diction such as growth and innovation reflects managerial efforts to communicate strategic optimism, especially when the company faces external pressures or economic fluctuations. Thus, the predominance of words with constructive connotations in financial reports indicates the presence of a planned rhetorical message to emphasize the company's image as a resilient, visionary, and adaptive entity to market changes.

The rhetorical tendencies in the use of these words suggest that financial statement narratives are more often directed at building perceptions of success and stability than explicitly outlining risks. Beattie (2014) and Craig and Amernic (2018) state that accounting narratives have a legitimizing function, where word choice is strategic to maintain stakeholder trust. The use of terms such as "challenge" is often rhetorically positioned to emphasize an organization's ability to overcome difficulties, while "performance" is used to reinforce claims of productivity and management effectiveness. Loughran and McDonald (2022) add that this pattern of dominance of positive terms indicates the practice of narrative impression management, namely controlling public perception through language that frames success. Therefore, this lexical dominance not only reflects optimism but also emphasizes the role of narrative as a strategic medium in building corporate reputation and legitimacy.

DISCUSSION

The research findings confirm that financial reporting narratives in Indonesia are still rife with an optimistic bias. This aligns with Loughran & McDonald's (2022) findings that management often uses positive language to maintain its public image. In the Indonesian cultural context, this optimism is reinforced by communication norms that avoid confrontation (Beattie, 2014).

The tendency toward an optimistic tone isn't always accompanied by improved financial performance. This suggests the potential for narrative impression management, where management controls perceptions through specific word choices. Theoretically, this phenomenon supports organizational communication theory, which views narrative as an instrument of legitimacy.

Topic modeling analysis also showed that risk narratives only occupied a small portion of the overall text. This raises questions about transparency and the balance of disclosure. Auditors and regulators can use this approach to detect linguistic bias or inconsistencies between narratives and numerical data. Furthermore, the use of a text analytics approach opens up opportunities for integration between technology and accounting. With the advancement of machine learning, narrative analysis can be expanded to predict financial risk and market behavior.

CONCLUSIONS AND RECOMMENDATIONS

The research results show that the application of digital text analytics can interpret accounting language systematically and objectively. This approach allows for the deciphering of semantic meanings and narrative patterns hidden behind the preparation of financial reports, allowing for quantitative analysis of the linguistic dimensions. The analyzed financial report narratives exhibit a highly optimistic tendency, with the language often emphasizing growth, strategy, and innovation as symbols of corporate success. However, this optimistic tendency does not always reflect the company's actual performance. These findings confirm that the language in financial reports functions not only as an informative tool but also as a strategic communication instrument used to shape public perception of organizational performance. Thus, digital text analytics plays a crucial role as a scientific method in understanding the dynamics of financial communication, which has traditionally been qualitative and subjective.

From a theoretical perspective, this research broadens the scope of computational linguistics application in accounting, particularly in the context of Indonesian, which has distinct cultural and communication characteristics from English, the dominant language in global financial literature. This approach integrates text analysis technology with legitimacy theory and organizational discourse to assess the function of narratives in building corporate credibility. Practically, this research offers a computational analysis tool that can be utilized by auditors, investors, and regulators in assessing the objectivity and transparency of financial reports. The use of digital text analytics significantly contributes to improving the quality of corporate oversight, promoting accountability for financial information, and strengthening reporting systems based on honesty and narrative integrity.

ADVANCED RESEARCH

This study opens opportunities for advanced research by integrating deeper computational models to detect narrative bias, tone-performance inconsistencies, and linguistic manipulation in financial reports. Future studies can apply transformer-based language models, conduct cross-linguistic comparisons between Indonesian and global disclosures, and use longitudinal text data to analyze narrative shifts across economic or regulatory changes. Further integration with behavioral finance and auditing practices can enhance automated red-flag systems, strengthen oversight, and develop culturally contextualized narrative risk indicators in financial reporting.

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