# The Language of Leadership: A Comparative Sentiment Analysis of Male and Female Executives' Letters in Annual Reports

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## Abstract

Ensuring effective communication is an undisputed technique for top management and executive board members to establish and maintain strong bonds with shareholders, partners, and employees. This study upfolds a wide range of interpretations of the corporate executives' annual letters through gender diversity lenses. These letters serve as a promotional genre that rationalizes organizational strategy, achievements and sustainability policies.

In this paper, the relationship between sentiment expressed by executives in annual reports and corporate performance has been analyzed through natural language processing measurement tools (VADER) and readability measures. We calculated the correlation and mean differences of these textual attributes of 62 executive letters communicated within 38 companies located in the MENA region. The findings indicate that female managers generally use simpler language and neutral vocabulary, emphasizing clarity and objectivity, whereas male managers tend to employ more positive language, expressing optimism and positivity.

In a nutshell, this study aims to unveil unconscious biases' nuances in annual executive letters. We conclude that an existing connection between directors' statements and the financial and sustainability performance of the company is established. It is essential to note that gender-inclusive communication practices are encouraged as part of corporate transparency in fostering inclusive and diverse organizational success and limiting opportunistic reporting practices.

***Keywords:*** *Executive letter; ESG performance; financial performance; gender diversity; natural language processing; sentiment analysis*

## Introduction

A growing trend towards improving corporate performance underlying drivers of performance lies beneath the major role played by stakeholders. It is legitimate to embrace a moral consideration of their engagements and commitments towards the firm or the corporation. A very recent study conducted by Civera et al. (2023) through which they raise the question of corporate performance and its interconnectedness with stakeholders and their engagement. They pinpointed that despite “the many advancements in stakeholder engagement scholarship over the past few decades (Kujala et al., 2022), at least one key question remains—do companies narrow their stakeholder communication practices to a very select group of stakeholders, or do they cast their stakeholder engagement nets wide by applying a multi-stakeholder approach?”.

The premises of establishing a sustainable and a corporate social responsibility between stakeholders and organization is essentially looked at as crucial to the strategic planning and decision-making (Castelló et al., 2016; Noland & Phillips, 2010; Ramus & Vaccaro, 2017) innovation of any given firm. The phenomenon expands in involving each party’s development of a growing corporate performance in business. Various outcomes of this association between prominent organizational personalities and stakeholders can be easily and widely reflected in the influential executive letters in annual reports. Obviously, the letters serve as strategic narratives that shape stakeholder perception. They communicate a company's performance, strategies, and outlook, often reflecting the underlying character of the organization.

Sentiment analysis, a technique for uncovering emotional tone in text, offers a powerful tool to understand these narratives. By analyzing sentiment in executive letters, researchers can determine the emotional tone of the message, which can impact stakeholder perceptions. Positive sentiment can build trust and confidence, while negative sentiment may raise concerns. The communication exhibited through the letters has a broader sense in building and developing stakeholder engagement (Bottenber et al., 2017). Most organizations concentrate on their productivity and performance through more committed and engaged stakeholders and it is surely a reciprocal engagement. According to Kujala and scholars (2022):

> "Stakeholder engagement is moral if the organization has good intentions and/or the relationship is reciprocal and voluntary. Several scholars propose that stakeholder engagement is morally positive if it involves recognition and respect (Noland & Phillips, 2010), doing good (Miska et al., 2014), empowerment of stakeholders (Ghodsvali et al., 2019), or the consideration of stakeholders' wants, needs, and capabilities (Todeschini et al., 2020). Indeed, as the use of the stakeholder concept itself is an indicator of the understanding of business actions as moral actions (Purnell & Freeman, 2012), stakeholder engagement literature often implicitly indicates the moral component." (p. 53)

However, when looking at the big picture stakeholders' role in receiving and perceiving the letters is of extreme importance. At all organizational stages, both stakeholders and executives should feel part of the firm's value co-creation processes which is corroborated (Civera & Freeman, 2019; Philips, 2003). A huge importance has been already given to stakeholders, starting with the morality of their engagement to the executives' letters directed at them. At this stage, framing an organization's first way of communication through letters pushes the research to investigate the impact gender difference in communicating the executive letters. That's been said that the language used in letters to stakeholders should be widely understood and therefore perceived as more trans-parent, trustworthy, and legitimate (Civera et al., 2022).

A deeper understanding of the employment of sentiment analysis tool is well elaborated on by Civera and other scholars in accentuating on the essence of using executive letters where they recommend that employing language that signals all stages of stakeholder engagement (such as stakeholder recognition, support, and dialog) with various groups, with a primary focus on the relationships with societal institutions, as comprehensive, effective, and engaging communication that might affect all other stakeholders who read the letter. An interesting point to tackle at this level is *how does the gender of executives affect their communication style towards stakeholders?* Gender stereotypes can influence language use, potentially manifesting in executive letters. Understanding how gender influences sentiment and linguistic features provides valuable insights into corporate communication dynamics.

The increase of women in leadership positions goes beyond diversity; it is linked to improved decision-making and financial performance. A significant increase in women's participation in managerial positions has been demonstrated by several studies over the past decades (Ayman et al., 2009). Investigating the unique value women bring through sentiment analysis of their executive letters offers valuable knowledge for both academics and industry leaders. However, according to the Fortune 500[1] Arabia list, which lists the 500 largest companies in the Middle East and North Africa (MENA) region, only 15 out of the 500 businesses are led by female CEOs, accounting for a mere 3%. This statistic highlights the urgent need for increased female representation in top leadership positions across various industries.

This paper explores the comparative sentiment analysis of executive letters, with a focus on the influence of executive gender, in the MENA region companies. The aim is to shed light on gender dynamics in corporate communication and their impact on stakeholders and organizational performance. The study examines how male and female executives differ in expressing corporate sentiment, as well as the coherence of their discourse with the financial and Environmental, Social and Governance (ESG) performance of their companies. It signals open interesting avenues for interpreting through sentiment analysis tool the extent to which gender differences might be a key factor in perceiving the performance of executives along with the efficiency of the communicated letters and their impact on productivity and performance.

Despite the overarching scholarship of corporate performance and its impact on both shareholders and stakeholders, our study stems its novelty in new sensemaking of executive letters and expanding the focus on gender neutral lexicon or positive/ negative or at other levels

[1] https://fortunearabia.com/en/Home/Fortune-500-Arabia

subjective/objective ones. It implies a comparative study of the changes undergoing through letters to stakeholders sharing different sentiments. It elicits an understanding of different corporate layers and how they can be of a certain influence when changing from one gender to another. However, it all remains a hypothesis until proven either accurate or inaccurate to which sentiment analysis tool plays the major role in identifying the discrepancies in the communicated letters and in stakeholders' perceptions.

The rest of the article is organized as follows: Section 2 discusses prior literature in executive letter, gendered sentiments and hypotheses development, while the methodology, data sources, sample selection and research design are presented in section 3. The discussion of the results of our empirical analysis are shown in section 4. Finally, section 5 offers the conclusion of the current study and implications.

# 2. Theoretical framework

## 2.1. The Strategic Legitimacy of Executive Letters

Based on the theory, annual reports reflect a shared responsibility between companies and its stakeholders including all concerned parties even the environment (Turzo et al., 2022) which must be considered as a tool for managing relationships and addressing its concerns and interests. Evidence from varied executive paradigms substantiates that the shared responsibility between companies' leadership board and stakeholders evaluates a certain behavior when the leading figure is male or female. At this stage of the current research, nothing is assumed or proven with regards to the executive letters to stakeholders' samples, but essentially based on a theoretical background which introduces a 'role of congruity' theory (Eagly & Karau, 2002).

The role-based behavioral interpretations stem its legitimacy primarily from prejudice toward female leaders. Both Eagly and Karau believe that the role of congruity and incongruity is the "consistency or inconsistency between the perception of descriptive and injunctive qualities associated with two social roles that an entity simultaneously occupies." When processing the expected requirement for success, role congruity theory suggests that bias may arise from a stereotypical pre-definite behavior about a given social role. It is essential to understand that gender stereotype, according to Tremmel & Wahl (2023), “may not always be conscious and evaluators may attempt to mask their gender stereotypes, [as] it is difficult to scrutinize [it] with ratings on gendered characteristics”.

Observation of management leadership roles paves the way to a better understanding of a cross-cultural transferability of assigned gender roles to executives and managers. The preference attributed to leaders with male characteristics is of no surprise to several studies even recent ones. Considerable scholarly attention to the role of congruity has helped our research stream to build a hypothesis on the efficiency of the executive letters to stakeholders without opting for gender-based prejudice assessment. Nevertheless, it is almost impossible not to acknowledge the existence of gender-based prejudice in leadership contexts where female gender roles are believed to be less favorable either in their leadership position or leadership behavior (Hoobler et al., 2009).

The assumptions of female leadership struggle in the pursuit of genderless roles plays a pivotal role in the promotion of inconsistent perception between gender stereotypes and prescriptive attributes of leadership roles, as suggested by del Carmen, Song, Um, & Huang (2024), who in this realm base their interpretations on previous scholarships that of Eagly & Karau, 2002; Lee & James, 2007; Parker, Mui, & Titus, 2020. The correlation between gender stereotype and attributes of leadership engages the executive letters’ samples into an observational interpretation of the extent to which the aforementioned norms could affect the performance, productivity, and engagement of the leader. This leads us to set our first hypothesis:

The inequalities perceived in attributing certain characteristics to male over women are capturing new insights into understanding the stereotype phenomenon. However, what the current paper is suggesting is a scrutinized study of the executives’ letters that might have encountered the typical prejudice or evaluation by free association of male or female identification toward leadership positions. Stereotypically, men and women are associated with a variety of terminologies that might arise throughout the present study. It leads us back to the role of congruity theory which attributes successful leaders' characteristics according to the perception and the prejudice of female leaders.

The research context proposes a significant explanation of the relationship between gender roles and gender attributed characteristics. Therefore, the sample of the executive letters presents an original framework to lead our hypothesis to a full understanding of what lies beneath and beyond gender stereotypes and the role of congruity in top management leading positions. Moreover, scholars believe that those letters are the key communication pillar to establish a balanced and productive atmosphere among stakeholders and executives. In a further explanation, transparency and accountability to stakeholders are reports' major focus (Herremans et al., 2015) which leads to meeting social and environmental goals. Annual reports are then seen as an attempt to demonstrate compliance with social responsibility and sustainability norms and to secure legitimacy from stakeholders. (O'Donovan, 2001).

## 2.2. The Executive Letter as a Strategic Signaling Tool

The annual executive letter serves as a strategic tool for managers to communicate optimistic outlooks about the company's future, its financial well-being, and its commitment to sustainability initiatives. This concise communication medium becomes a powerful tool for creating a favorable narrative that effectively appeals to both financial goals and societal values and shapes the readers' sentiments (Amran & Ooi, 2014).

Varghese and Jayasree (2013) defined sentiment analysis as a machine learning approach to analyze and classify sentiments related to expressed textual topics. Harymawan et al. (2019) added that sentiment analysis is related to the identification and classification of expressed opinions. This statement was expanded by Baretta et al. (2021), who explained that sentiment analysis in information disclosure refers to the language used in corporate reporting.

This language can reflect an optimistic, pessimistic, or neutral tone regarding the company's performance. According to Kaur and Bhatia (2016), the purpose of sentiment classification is to recognize whether the tone or sentiment of the text expresses a positive or negative opinion about the subject. Gandía and Huguet (2021) add that sentiment analysis can be used to search for hidden meanings in corporate disclosures. This is because textual sources may contain information that does not correspond to reality, either because there is an intention to "sweeten" the actual financial situation and performance of the company.

According to Vinodhini and Chandrasekaran (2012), there are 4 classifications of sentiment. The first classification is machine learning, or what is usually called supervised learning because it requires training and testing to analyze documents. This approach can classify documents automatically. One technique is machine learning using support vector machines (SVM), which has been successful in text categorization and is considered the best classification method. The second classification is semantic orientation, which is called unsupervised learning because it does not require prior training to mine data. This approach measures how much a word tends to be positive and negative. The third classification is the role of negation which can influence other polarities, so it needs to be considered in sentiment analysis. Then the final classification is feature-based sentiment classification, which is an unsupervised information extraction system which extracts review features and opinions from documents. According to Varghese and Jayasree (2013), sentiment analysis is a machine learning approach in which machines analyze and classify sentiments, emotions, and other polarities about topics expressed in text form.

Several previous researchers have attempted to examine sentiment in corporate disclosure, including Baretta et al. (2021) in Italy, who categorized sentiment as positive and negative. The results of this research showed that the disclosure of non-financial information in the automotive industry used sentences with positive (optimistic) sentiment. Another study on the tone of language in annual reports was conducted by Martikainen et al. (2019) which categorizes sentiment as positive, negative, and total. The results show that the tone of language in annual reports tends to be positive.

This contrasts with the research of Pengnate et al. (2020) which examines narratives in United States and Japan corporate financial reports. The research classifies sentiment into positive, negative, and neutral. The main findings suggest that the sentiment expressed by managers in shareholder letters may be related to firm performance during an economic crisis, and that financial reporting tone tends to be biased because management is reluctant to communicate bad news that could affect the company's market value or corporate reputation.

Chen et al. (2013) also conducted opinion mining research to link subjective expressions and annual earnings in U.S. financial reports. The research results showed that management tried to choose more optimistic words to hide negative financial performance. In addition, the researchers also found that the disclosure of a decline in earnings was presented in biased sentences, while an increase in earnings was presented in a firm and positive tone.

This leads us to set the following hypotheses:

| |
|---|
| **H1a:** There is a positive relationship between executive letter sentiment and a firm’s financial performance. |
| **H1b:** There is a positive relationship between executive letter sentiment and a firm’s environmental and social governance (ESG) performance. |

### 2.3. Gendered Sentiments in the Executive Letter

Our study focuses on sentiment analysis of executives' letters. It aims to assess whether a document, or a sentence communicates favorable, negative, or neutral sentiments toward various events experienced by the firm. This sentiment data is fed into predictive models of stochastic variables that quantify the behavior of the subject of interest, in our case, the corporate management. The sentiment analysis tool is employed to accommodate the different attributes of leadership positions. This article assesses whether it is possible to detect attributes of leadership in terms of Objectivity/Subjectivity; Negativity/Positivity; and Neutrality within the communicated executives' letters.

A connection between a sentiment-based letter and gendered sentiment might be of interest to our study. It is a similar rationale to that of our hypothesis that executives' letters tend to communicate professionalism and productivity without any incorporation of a gender-aware lexicon. It is however agreed that "the computer-based estimation of the sentiment expressed in text, such as its overall polarity, the range of emotions expressed, or the strengths of any opinions" (Thelwall, 2018) is based on gender biases lexical sentiment authored by males and females. It is, therefore, interesting to highlight what Mike Thelwall managed to find in terms of gendered sentiment analysis which has essentially accentuated on the fact of contrasting accuracy of lexical sentiment. It has been demonstrated that less explicit expressions are coined with male sentiments which happen to be harder to detect.

It is more likely that male and female expressions are presented from the lenses of gender bias narrative where "social status is defined as the amount of respect received from others (Magee and Galinsky, 2008). Considering that the social status provided to leaders does not systematically entail any preference among gender; power, however, presents a leading factor to focusing on self, where status often motivates people to monitor their own status in relation to others and to attend to others' evaluations (Anderson et al., 2015; Blader et al., 2016). A possible explanation of how respect and power intertwine with sentiment analysis tool is that "the entry of women into senior management has generated much popular debate about whether they are 'making a difference' to the way organizations are run" (Wajcman, 1998). That has been said, gendered sentiment stems its viability through the experience of women in leading positions and how social expectations of women have a different sense when compared to men even when given the same roles.

It calls to attention the corporate approach to leadership and its connection to gender diversity implementation. Although corporate behavior is more lenient to male leaders more than female ones. Many studies have proven that gender and leadership can be juxtaposed especially with the influence of stereotypical perception of leadership style. Gendered sentiment tool is a stepstone in understanding to what extent managerial stereotypes and feminine leadership are still considered as elements of performance and productivity. In a recent study conducted by Sanne Feenstra et al. (2023) on managerial stereotypes over time, they have identified the stereotype of the “good” manager, which is characterized by masculine traits (e.g. be assertive, dominant and powerful) rather than feminine traits (e.g. be compassionate, warm and friendly; for a review see Koenig et al., 2011). Such biases are reflected not only in organizational structures but also in manager’s discourse.

Commitment to create a new corporate climate where both men and women leaders are expected to be evaluated and assessed based on their performance and productivity seems to be a general move away from hierarchical organization towards a more flexible corporate structure (Wajcman, 1998, p. 1969). It has been observed that women directors tend to prefer roles centered around gathering information rather than taking advantage of opportunities. The presence of female directors on boards enhances the integrity of reporting and boosts investor confidence in management communications.

According to Srinidhi et al. (2011), there is a perception that women demonstrate higher levels of moral maturity than men and are less tolerant of opportunistic behavior during the reporting process. In addition, Merkl-Davies and Brennan's (2007) framework suggests that organizations can strategically manage their stakeholder's impression by prioritizing positive news. Thus, we can assume that a higher level of positivity in corporate reports could be related to an opportunistic behavior, which is more characteristic of men than women. Moreover, Bassyouny et al. (2020) suggest that the presence of women on boards accentuates the inclusion of more negative information and improves risk disclosure in annual reports. Their research confirms that female directors might influence the tone of annual reports by potentially reducing attempts at impression management, as female directors tend to share information in a more neutral manner. Thus, we hypothesize as follows:

**H2:** Companies directed by a women have a less positive tone in their annual narrative reporting.

# 3. Methodology

## 3.1. Sampling

The proposed workflow for selecting a relevant sample for our study involves several key steps and is conditioned by three criteria: the gender of the manager, the location in the MENA region and the availability of financial and ESG data. First, we analyzed the LSEG (former Refinitiv) database to find all companies with available financial data and an Environmental, Social and Governance (ESG) score. While this score measures the performance of a company in these three pillars of Corporate Social Responsibility (CSR), the financial indicators are used to assess its financial performance.

From these ESG rated companies, we selected the Western Asia and Northern Africa (WANA) region ones having a woman as a top manager. It includes nations in both the Western Asia (Armenia, Azerbaijan, Bahrain, Cyprus, Georgia, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, State of Palestine, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen) and the Northern Africa (Algeria, Egypt, Libya, Morocco, Sudan, Tunisia, Western Sahara). This region is distinguished by its historical relevance, cultural richness, and geopolitical importance. This terminology (WANA) is preferred to Middle East-North Africa (MENA).

In this second stage of sampling, we found 38 companies for which at least one annual report containing the manager's letter was available for the period from 2022 to 2023. Finally, we selected and analyzed 62 letters from 31 men and 31 women.

## 3.2. Sentiment Analysis Techniques and Metrics

### 3.2.1. Sentiment analysis Measures

Sentiment analysis technique is the technique used for this research. First, the text corpus is created and processed, with a special focus on companies in the MENA region, from executive sustainability reports or integrated annual reports. The text pre-processing phase includes also removing images, converting all letters to lowercase, removing non-alphanumeric symbols, dots, and letters attached to special characters.

Next, sentiment estimation is performed using an unsupervised lexicon-based method, prioritizing efficiency, and practicality for the research goals. The method uses sentiment lexicons or dictionaries, such as the one compiled by Loughran and McDonald (2014), to classify sentiment in documents based on the occurrence of certain words or syntactic patterns. In this study, we employ VADER (Valence Aware Dictionary and Sentiment Reasoner), which is an approach to classify text information into different sentiment categories namely negative, positive, and neutral. VADER also allows the estimation of a subjectivity/objectivity score. The classification capability of VADER is done by assigning a value to each word in the text. The value is based on a number found by Hutto and Gilbert (2014) through their research on humans as raters. Scoring on word choice varies from -1 to +1, where values above 0.05 are positive, below -0.05 are stated as negative, and between -0.05 to 0.05 are said to be neutral (Hutto, C.J. and Gilbert, 2014).

The use of the VADER approach to sentiment analysis of company management disclosures has already been applied in previous studies. Some of them are research by Deveikyte et al. (2020) which examines the relationship between sentiment on news and stock prices. Similar research was also conducted by Camodeca et al. (2018) which examines the relationship between sentiment on integrated reports and company value.

The result of sentiment analysis with the VADER approach provides information on the proportion of sentences with the measured sentiments from the tested text. The resulting scores (negativity, neutrality and positivity) are then used to analyze the coherence between the discourse and the company's financial and sustainability performance. Myšková and Hájek (2017) say that document tone (sentiment) is significantly influenced by corporate performance. This confirms that disclosure sentiment in each company is indeed influenced by a range of factors and that the tone used is supposed to be in coherence with these factors.

### 3.2.2. Text ambiguity and precision Measures

Assessing the ambiguity or precision of a document is a difficult process because it sometimes requires subjective judgments. However, there are several methods and metrics that can be used to estimate the ambiguity or precision of a text:

- **Specificity**: This metric measures the specificity of word choice in a text. It represents the proportion of specific words (excluding stop words) in relation to the total number of words in the text. Higher specificity scores correspond to more precise and specific language use.
- **Subjectivity**: This metric measures the subjectivity of the text and the extent to which it reflects ideas, feelings, or beliefs rather than factual information. It ranges from 0 to 1, with 0 representing objective language and 1 representing subjective content.
- **Flesch Reading Ease (FRE)** evaluates the readability of text by calculating the average sentence length and number of syllables per word. Higher scores indicate easier reading and materials that are easier to read.
- **Flesch-Kincaid Grade Level (FKG)** calculates the grade level required to understand the material based on the average sentence length and number of syllables per word. It

represents the grade level in the United States (for example, a score of 8.0 indicates that an eighth-grade student can understand the content).

- **The Gunn-Fog Index (GFI)** estimates the number of years of formal education required to understand the material based on the average sentence length and the percentage of complicated vocabulary (words with three or more syllables). Higher scores correspond to material that is more difficult to read.

## 3.3. ESG Performance Metrics

LSEG (formerly Refinitiv) Environmental, Social and Governance (ESG) score evaluates a company's sustainability and ethical practices. It considers three key factors:

- **Environmental:** Assesses the company's environmental impact, including carbon footprint, energy use and waste management.

- **Social:** Assesses the company's relationships with stakeholders with a focus on labor practices, diversity, and human rights.

- **Governance:** Evaluates corporate governance processes, openness, and adherence to ethical guidelines and rules.

The score, which is usually a numerical indicator between 0 and 100, indicates how well a company performs in these categories and helps investors and stakeholders assess sustainability practices and risks.

## 3.4. Financial Performance Metrics

As the purpose of our study is to assess the coherence between the sentiment conveyed by the manger’s letter and the financial performance of the company, we adopted the following metrics:

- **ROA (Return on Assets):** ROA measures the profitability of a company relative to its total assets. It is calculated by dividing the net income (profit) by the total assets. The formula for ROA is ROA = Net Income / Total Assets. A higher ROA indicates better efficiency in generating profit from the assets owned by the company.

- **Market Cap (Market Capitalization):** Market cap represents the total dollar market value of a company's outstanding shares of stock. It is calculated by multiplying the number of outstanding shares by the current market value of one share. Market cap helps determine a company's size and is used for comparisons with other companies.

- **Total Assets:** Total assets are the value of all resources owned by a company. These resources include both liquid assets (easily converted to cash) and illiquid assets (not readily sold for cash). Total assets are recorded on the balance sheet and provide insight into the company's financial health and investment capacity.

- **Debt-to-Equity (D/E) Ratio:** The D/E ratio evaluates a company's financial leverage by comparing its total liabilities to its shareholder equity. It measures the extent to which a company relies on debt financing. The formula for D/E ratio is Total Liabilities / Total Shareholders' Equity. A higher D/E ratio suggests more risk, while a low one may indicate underutilization of debt financing.

- **Revenue from Business Activities - Total:** Revenue, also known as sales, is the money generated from normal business operations. It is calculated as the average sales price multiplied by the number of units sold. Revenue is the top line figure from which costs are subtracted to determine net income.

## 4. Results and discussions

In this study, quantitative analysis of sentiment metrics revealed distinct writing styles between the two gender groups. In this section, we present our results based on the distribution of the selected sample, the sentiment analysis by gender and the correlation between the sentiment metrics and ESG and financial performance metrics by sector and performance level.

### 4.1. Sample distribution

Table 1 – Distribution of companies by country and industry

| Country | # of companies |
|---|---|
| Turkey | 9 |
| Kuwait | 6 |
| Egypt | 4 |
| Morocco | 4 |
| Tunisia | 3 |
| Saudi Arabia | 3 |
| United Arab Emirates | 2 |
| Qatar | 2 |
| Bahrain | 2 |
| Oman | 2 |
| Jordan | 1 |
| **Total** | **38** |

| Sector | # of companies |
|---|---|
| Finance and Insurance | 19 |
| Manufacturing | 9 |
| Utilities | 2 |
| Retail Trade | 2 |
| Educational Services | 2 |
| Real Estate and Rental and Leasing | 2 |
| Information | 1 |
| Transportation and Warehousing | 1 |
| **Total** | **38** |

The sample consists of 62 executive letters from 38 companies from different countries and sectors. Turkey leads with 9 firms, followed by Kuwait with 6 and Egypt and Morocco with 4, demonstrating a broad corporate presence across the region. Saudi Arabia and Tunisia have three companies, while United Arab Emirate, Bahrain, Oman and Qatar each have two, and Jordan has the fewest with one. Finance and insurance have the most companies (19), followed by manufacturing with 9. Each of the retail trade, utilities, real estate and education sectors contribute by two companies, while the information, transportation, and warehousing industries each have one company.

## 4.2. Descriptive Statistics

Table 2 provides descriptive statistics on the variables used in a study of sentiment analysis of CEO letters in annual reports.

Table 2 - Descriptive Statistics of the Study Variables

| Variable | Mean | Std Dev | Min | Max |
|---|---|---|---|---|
| Gender | 0.50 | 0.5041 | 0 | 1 |
| Specificity | 0.6118 | 0.0716 | 0.5254 | 0.9683 |
| Negative | 0.0223 | 0.0218 | 0.0000 | 0.1030 |
| Neutral | 0.8136 | 0.0421 | 0.7300 | 0.9550 |
| Positive | 0.1641 | 0.0438 | 0.0190 | 0.2570 |
| Compound | 0.9031 | 0.4230 | -0.9764 | 0.9999 |
| Subjectivity | 0.3947 | 0.0759 | 0.1500 | 0.6487 |
| Flesch Reading Ease | 38.712 | 10.8895 | 4.1500 | 58.8200 |
| Flesch-Kincaid Grade | 14.212 | 2.8365 | 9.9000 | 27.1000 |
| Gunning Fog Index | 15.191 | 2.7958 | 11.3800 | 29.7500 |
| ESG Performance | 52.470 | 17.6425 | 18.5032 | 86.2007 |
| CSR Strategy Score | 52.318 | 28.2816 | 0.0000 | 98.0000 |
| ROA | 28.898 | 24.4491 | 0.0000 | 50.0000 |
| MarketCap | 22.305 | 2.6737 | 16.9789 | 26.2221 |
| NetDebtToEquity | 0.3959 | 2.1412 | -2.0589 | 9.8458 |
| Total Assets | 23.014 | 2.6544 | 18.1261 | 27.6321 |

The analysis examines various dimensions, including linguistic and financial aspects of these corporate communications. Looking at the gender distribution, the average value is 0.5, indicating a balanced representation. This balanced distribution is crucial to ensure fair representation and minimize potential bias in the analysis.

When discussing sentiment, the compound score was high at 0.903. This indicates that the letters had an overall positive sentiment. However, the means showed variation across the different sentiment types. Negative sentiment had a mean of 0.022 and a standard deviation of 0.022. Neutral sentiment had a mean of 0.814 and a standard deviation of 0.042. Positive sentiment had a mean of 0.164 and a standard deviation of 0.044. This variability in expression underscores the nuanced nature of sentiment within letters.

Readability scores such as Flesch Reading Ease (FRE) (38.7 on average), Flesch-Kincaid Grade (FKG) (14.2), and Gunning Fog Index (GFI) (15.2) indicate moderate language complexity in CEO letters. This suggests that while the language is not overly complex, it requires a certain level of literacy and comprehension to be fully understood.

In addition, the moderate subjectivity score of 0.395 indicates a balanced use of objective and subjective language in these letters. Maintaining this balance is key to credible and persuasive corporate communication. It allows for the expression of opinions and insights while grounding them in factual information.

ESG metrics show a range of results. Companies approach CSR goals differently. Their work varies widely. The average CSR strategy score is 52.318, with a standard deviation of 28.282. This shows that some companies emphasize CSR strategies more than others. The ESG Performance score averages 51.470, with a standard deviation of 17.642. Performance on environmental, social and governance issues varies widely across companies.

Finally, the analysis shows that companies' finances vary widely. Return on assets averages 28.898. Market capitalization averages 22.305. Total assets average 23,014. The differences could be due to industry, markets, management, and other reasons. Some companies are larger, healthier, or better managed. Others struggle with finances, size, or management issues.

### 4.3. Sentiment analysis results by gender

Table 3 shows the difference in means of sentiment analysis and readability metrics for manager letters categorized by gender, specifically female and male managers.

Table 3 – Difference in means of sentiment metrics by gender

| Average scores | Female | Male |
|---|---|---|
| Gunning Fog Index (GFI) | 15.41 | 14.97 |
| Flesch-Kincaid Grade (FKG) | 14.36 | 14.07 |
| Neutral | 0.82 | 0.81 |
| Specificity | 0.62 | 0.60 |
| Negative | 0.03 | 0.02 |
| Flesch Reading Ease (FRE) | 38.70 | 38.72 |
| Compound | 0.81 | 1.00 |
| Subjectivity | 0.39 | 0.40 |
| Positive | 0.15 | 0.18 |

The Gunning Fog Index and Flesch-Kincaid Grade, which indicate text readability, show slightly higher scores for female managers compared to their male counterparts. This suggests that letters from female managers may have slightly more complex sentence structures or use longer words on average.

In terms of sentiment analysis, the neutral sentiment score is slightly higher for female managers, suggesting that their letters may contain slightly more neutral language or opinions. However, the negative sentiment score is also slightly higher for female managers, indicating that their letters may contain slightly more negative language or sentiment. Conversely, the Compound Sentiment score, which represents overall sentiment, is slightly higher for male managers, suggesting that their letters may have a slightly more positive overall sentiment than those written by female managers. This confirms our hypothesis H2.

In terms of readability, the Flesch Reading Ease score, which measures ease of reading, is similar for both genders, indicating comparable levels of readability. Similarly, the subjectivity score, which measures the degree of subjectivity in the text, is comparable between female and male managers.

Taken as a whole, these findings suggest that there may be nuanced differences in the communication styles of female and male managers. Female managers may prioritize neutrality and objectivity in their communication, possibly reflecting a cautious or measured approach. In contrast, male managers may lean toward a more positive and optimistic tone, possibly indicating a tendency toward confidence or assertiveness in their communication style (Srinidhi et al., 2011; Bassyouny et al., 2020).

4.4. Correlation between sentiment metrics and corporate performance

The correlation matrix (Table 4) illustrates the relationship between company performance and the language used by CEOs. Companies with lower ESG scores tend to provide more detailed information, resulting in CEO letters that sound more negative (-0.14 specificity, -0.13 compound). This suggests that these firms are more direct in addressing challenges and risks (Ntim et al., 2013; Allini et al., 2016; Bassyouny et al., 2020).

Table 4 – Correlation between sentiment metrics and corporate ESG and financial performance

| Variable | Specificity | Negative | Neutral | Positive | Compound | Subjectivity | FRE | FKG | GFI |
|---|---|---|---|---|---|---|---|---|---|
| **ESG Performance** | | | | | | | | | |
| ESG Performance | -0.1419 | 0.2525 | -0.0386 | -0.0888 | -0.1318 | 0.1252 | 0.0185 | -0.1257 | -0.2142 |
| CSR Strategy Score | 0.1549 | 0.0498 | -0.0010 | -0.0236 | 0.2600 | 0.3204 | 0.0832 | -0.1866 | -0.2359 |
| **Financial Performance** | | | | | | | | | |
| ROA | 0.1538 | -0.2558 | 0.1583 | 0.1624 | 0.2230 | -0.2280 | -0.1220 | 0.2357 | 0.2429 |
| MarketCap | 0.0805 | 0.0782 | -0.0070 | -0.0305 | -0.1774 | 0.2026 | -0.1841 | 0.0934 | 0.0140 |
| NetDebtToEquity | -0.0456 | 0.1116 | -0.0205 | -0.0354 | 0.0435 | -0.0518 | 0.1802 | -0.1561 | -0.1693 |
| Total Assets | 0.0119 | 0.0469 | -0.0884 | 0.0624 | -0.1007 | 0.1027 | -0.1559 | 0.0522 | -0.0170 |

The analysis of the relationship between performance and CEO communication is intriguing and reveals some interesting connections. Companies facing ESG challenges often use specific language and convey a pessimistic tone in their CEO's letters to shareholders. Conversely, a positive correlation was found between CSR Strategy Score and three factors in CEO letters: compound, subjectivity and negative sentiment (compound: 0.26; subjectivity: 0.32;

negative: 0.05). This suggests that companies with stronger CSR strategy may use a more positive but subjective, sometimes critical tone (negative), emphasizing their social responsibility commitment. This confirms our hypothesis H1b stating that there is a positive relationship between executive letter sentiment and a firm's environmental and social governance (ESG) performance.

The data indicates a significant correlation between financial performance, specifically Return on Assets (ROA), and many aspects of CEO letters, knowing specificity, positivity and subjectivity. It appears that financially performant companies present a more positive discourse (positive: 0.15; negative: -0.25; compound: 0.22). It shows also that companies with better ROA prioritize clear (specificity: 0.15), less subjective (-0.23) and positive communication, to convey a strong vision or narrative to stakeholders (Pengnate et al., 2020).

The analysis also revealed a negative correlation (-0.18) between Market Capitalization (MarketCap) and positive tone in CEO letters but a positive correlation with specificity. This suggests that larger companies tend to use less positive but more precise language, possibly indicating a preference for a more balanced and cautious style. This approach may be aimed at maintaining credibility and managing stakeholder expectations.

Additionally, the study indicates that companies with higher levels of debt tend to use simpler language in their CEO letters (FRE: 0.18). This is likely due to the need for clear communication when discussing complex financial matters. However, CEO letters from larger companies tend to have lower scores on reading ease (FRE: -0.16; GFI: -0.17), because they address more intricate operations and a wider range of stakeholder needs.

Thus, it appears that large companies often use complex CEO letters. This reflects their multifaceted nature. In contrast, indebted companies strive for simplicity. This may be to inspire confidence in the face of financial complexity. Company circumstances shape communication strategies, as seen in the distinct approaches of larger corporations and indebted firms, which confirms our hypothesis H2b stating that there is a positive relationship between executive letter sentiment and a firm’s financial performance.

## Conclusion

This study examines the coherence between the tone of executive' letters to shareholders in annual reports and a company's financial and ESG performance. The results confirm the hypothesis, demonstrating a significant association between the tone of these letters and both a company's financial health and its commitment to environmental and social issues. Based on the analysis of 62 letters from the heads of 38 companies in the MENA region using VADER analysis and readability tests, we ended up with a comprehensive understanding of the studied linkage. We then compared the sentiments expressed in the letters with the financial performance of the companies and their approach to environmental and social responsibilities.

In studying and analyzing the correlation between the language used by male and female managers and their companies' performance; findings suggest that female managers tend to use simpler language and employ more neutral vocabulary, while male managers tend to use more positive language. Female managers prioritize clarity and objectivity, while male managers tend to express optimism. Companies with low ESG scores typically receive more negative messages from their CEOs, while those with strong CSR policies may express themselves more assertively. In addition, financially successful companies tend to use more positive and less personal language, while larger companies use precise but less positive language. Moreover, it appears that a company's communication readability varies depending on its circumstances, with larger companies opting for more complex language and those with high debt levels choosing simpler language during difficult times. These insights demonstrate the small yet significant differences in how managers communicate and how it impacts their companies.

However, it is important to note that this study has limitations as it only analyzed executive letters from companies in the MENA region, and therefore, the findings may not be universally applicable. The study had also a limited sample size, which could potentially weaken the results. Moreover, while the VADER method and assessing readability are useful, incorporating additional methods for analyzing the executive message could provide a more comprehensive understanding of managerial communication.

In the future, we could investigate the link between executive communication and company success by analyzing firms from various locations and incorporating cultural factors. This broader perspective could provide insight into how the tone of executive letters correlates with company outcomes and manager's characteristics. By utilizing innovative tools such as word analysis technology and machine learning models, we could gain a more precise understanding of the nuanced ways in which managers communicate.

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