

Reading the CEO's Face: The Effect of Facial Masculinity on the Readability of MD&A Reports

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DOI: <http://dx.doi.org/10.15294/jda.v15i1.42995>

Submitted: February 28th, 2023 Revised: March 20th, 2023 Accepted: March 20th, 2023 Published: March 31st, 2023

Abstract

Purposes: This study analyzes the relationship between CEO facial masculinity and the readability of management discussion and analysis reports (MD&A). Furthermore, this study examines the interaction between CEO busyness and age in this relationship.

Methods: Cluster regression with fixed effects was used to examine 1,569 firm-years of non-financial firms listed on the Indonesia Stock Exchange from 2010-2019.

Findings: The results show that firms led by masculine-faced CEOs proved to be statistically significant in increasing the readability of MD&A reports, making it easier for them to read and understand. However, our findings also show that CEO busyness and age weaken the relationship between CEO facial masculinity and the readability of MD&A reports.

Novelty: This study is the first to examine the relationship between CEO facial masculinity and MD&A readability. This study has implications for corporate management and regulators.

Keywords: *Masculinity, Readability, Busy, Age, Accountability*

How to cite (APA 7th Style)

Raharjo, Y., Harymawan, I., Permatasari, Y., & Kamarudin, K.A. (2023). *Reading the CEO's Face: The Effect of Facial Masculinity on the Readability of MD&A Reports*. *Jurnal Dinamika Akuntansi*, 15(1), 68-84.

INTRODUCTION

Lo et al. (2017) stated that an average of 80% of mandatory disclosures in annual reports contain narrative text. This means that qualitative information dominates the annual report more than quantitative information such as numbers and graphs. Understanding is part of the qualitative characteristics of financial statements highlighted in the FASB's conceptual framework for financial reporting. The rules of the Otoritas Jasa Keuangan Indonesia also state that all information and content of company reports must be easy to read and understand. The firm's annual report is one of the communication media for firms to give signals to related parties about the firm's condition. One technique to evaluate the effectiveness of communication in annual reports is to measure the level of readability. This term is defined as an objective and quantitative measure to evaluate the ease of understanding of what Curtis (1986) has written. The level of

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legibility of the firm's annual report is an important thing that needs to be considered because it will affect the perception and assessment of the report users on the firm's condition.

Previous research has shown that the high or low level of readability of annual reports is caused by earnings management actions (Lo et al., 2017), CEO age (Xu et al., 2018), agency costs (Luo et al., 2018), the performance of corporate social responsibility (Bacha & Ajina, 2019), and the corporate environment (Xu et al., 2019). In addition, low readability of annual reports can result in lower stock liquidity (Boubaker et al., 2019), increased fees charged by auditors (Xu et al., 2019), low information efficiency (Hesarzadeh & Rajabalizadeh, 2019), and high cost of debt (Bonsall & Miller, 2017). These factors affect the readability of annual reports, which are essential to be studied in more depth because they concern regulators and investors (Li, 2008; Xu et al., 2018).

The role of a Chief Executive Officer (CEO) in an organization is crucial, as they have significant influence over financial and non-financial decisions (Bouaziz et al., 2020). In turn, the characteristics of a CEO play a pivotal role in determining the information that is disclosed in the annual report, as well as what remains hidden by the firm. One such characteristic that affects CEO behavior is the masculinity of their facial features. Research suggests that a person's behavior is linked to their testosterone levels through neural mechanisms (Dabbs & Mallinger, 1999; Mehta & Beer, 2010). Previous studies have found a correlation between the biological characteristics of a CEO, specifically the masculinity of their face, and the policies and financial performance of the firm (Kamiya et al., 2019). Furthermore, it has been established that various observable CEO characteristics, including age, education, gender, military experience, and busyness, can significantly impact a firm's financial policies (Mills & Hogan, 2020). While CEO facial masculinity serves as a proxy for internal factors, such as testosterone levels and their subsequent influence on behavior through neural mechanisms, busyness acts as a proxy for external factors within the CEO. By examining these CEO characteristics, we can gain insight into their leadership style and its impact on the firm.

Discussions related to the readability of firm reports have been investigated by previous researchers (Bonsall & Miller, 2017; Boubaker et al., 2019; Habib & Hasan, 2018; Hesarzadeh & Rajabalizadeh, 2019; Lo et al., 2017; Luo et al., 2018; Xu et al., 2018). Several previous studies also researched the relationship between CEO characteristics and the level of report readability. These characteristics include age (Xu et al., 2018), gender (Ginesti et al., 2018; Liu & Nguyen, 2020), narcissism, and CEO overconfidence (Seifzadeh et al., 2020). The novelty of this study lies in the different characteristics of CEOs, namely the masculinity of the CEO's face. In particular, there are still few studies related to the masculinity of CEO faces (Jia et al., 2014; Wong et al., 2011) in economics (especially accounting). The CEO's facial masculinity is a new proxy of the CEO's personal characteristics closely related to the CEO's biological or personal condition. This topic is unique and essential to be studied more deeply.

In this study, we incorporate CEO busyness and CEO age as moderating variables for several reasons. CEO busyness plays a significant role in their ability to effectively communicate and convey information in Management Discussion and Analysis (MD&A) reports. A CEO with a high level of busyness may have limited time to dedicate to crafting clear and concise narratives, resulting in less readable reports. On the other hand, a CEO with lower busyness, having more availability and fewer time constraints, can allocate sufficient resources and attention to produce more coherent and comprehensible MD&A reports. Consequently, busyness acts as a moderating variable, influencing the relationship between CEO masculinity and the readability of MD&A reports by impacting the CEO's capacity to communicate effectively. Additionally, age serves as another moderating variable due to its connection with experience and accumulated knowledge. CEOs who have been in their positions for a longer period typically possess greater expertise and better communication abilities. Older CEOs, with their accumulated experience, may demonstrate higher proficiency in presenting complex financial information in a clear and understandable manner. Thus, age moderates the relationship between CEO masculinity and MD&A readability

by influencing the CEO's level of communication expertise.

Qualitative information is essential in understanding the business environment in which the firm operates, describing the results of past performance, the firm's prospects in the future, and the risks faced by the firm. So that the clarity and legibility of the narrative text are crucial and needs attention because it relates to the understanding and interpretation of the information contained in the annual report by report users (Xu et al., 2018), a high level of readability will make it easier for investors and other annual report users to make the right decisions. This study measures the level of readability of the firm's annual report in the analysis and management discussion section. This section represents how management discloses and rationalizes its steps and performance (Li, 2012). This report contains mostly narrative text information, and firm management has the freedom to determine its layout (Lo et al., 2017). In addition, in this section, management discloses considerable qualitative information about the firm's condition, and management can choose what information to disclose.

The upper echelon theory, proposed by Hambrick and Mason in 1984, suggests that the characteristics and conditions of a CEO significantly influence a firm's output, including its performance and strategic decisions. According to this theory, the CEO's individual attributes shape their behavior and decision-making process, which in turn affect the overall functioning of the organization. One specific characteristic that can influence a CEO's behavior is masculinity. Masculinity refers to a set of traits traditionally associated with males, such as assertiveness, dominance, and risk-taking. Research has shown that these traits are influenced, to some extent, by the hormone testosterone. Testosterone is a steroid hormone found in both males and females, but males typically have higher levels of testosterone, which contributes to the development of masculine characteristics.

Facial masculinity is believed to be an outward indicator of a CEO's level of testosterone. Research has suggested that individuals with more masculine facial features, such as a strong jawline or prominent brow ridge, tend to have higher levels of testosterone. This hormone can influence behavior by encouraging individuals to take risks and seek dominant positions in competitive situations. Applying this to the context of CEOs, the theory proposes that a CEO's level of facial masculinity, influenced by testosterone, can shape their actions and decision-making processes within the organization. For example, CEOs with more masculine features may be more inclined to take risks and pursue aggressive strategies to establish dominance in their industry. They may be more likely to engage in competitive actions, such as mergers and acquisitions, to gain a dominant position in the market.

Furthermore, the theory suggests that the characteristics of the CEO, including facial masculinity, can also affect the information disclosed in the firm's annual report. CEOs may choose to emphasize certain information that aligns with their dominant and risk-taking behaviors, while downplaying or hiding other information that may undermine their position or reveal potential weaknesses. This selective disclosure can influence how stakeholders perceive the firm's performance and shape their expectations.

It's important to note that the upper echelon theory, including the influence of masculinity on CEO behavior, is a theoretical framework that provides a lens for understanding the impact of individual characteristics on firm outcomes. While there is evidence to support some aspects of the theory, it is not a comprehensive explanation for all CEO behavior and organizational outcomes. Other factors, such as organizational culture, industry dynamics, and external forces, also play important roles in shaping firm performance and strategic decisions.

Previous research in neuroendocrinology determined that the facial width-height ratio (fWHR) as a proxy for facial masculinity can predict masculine social behavior associated with occupying a dominant position in a competition (Archer, 2006; Dabbs & Mallinger, 1999; Kamiya et al., 2019; Mehta & Beer, 2010). In addition, a series of characteristics of human behavior is also related to the levels of testosterone in them. These behavioral characteristics include aggressive behavior (Archer, 2006; Mills & Hogan, 2020; Wong et al., 2011), sensation seeking (Roberti,

2004), dominance (Mazur & Booth, 1998; Sherman et al., 2016), egocentrism (Eisenegger et al., 2010), lack of trustworthiness (Stirrat & Perrett, 2010), and risk-seeking (Apicella et al., 2008).

There are two points of view in the relationship between CEO facial masculinity and the level of readability of the MD&A report. The relationship can be a positive relationship or a negative relationship. In the perspective of a negative relationship, masculine-faced CEOs have the possibility to commit fraud as revealed by Stirrat and Perret (2010) in their research. Men with a higher masculine face also tend to make risky financial decisions, more aggressive financial decisions, egocentrism, and even the tendency to take advantage of others for personal financial gain can increase the tendency of masculine-faced CEOs to engage in misreporting (Jia et al., 2014). To cover up misreporting, the CEO has the possibility to manage in such a way the information disclosed in the MD&A report. The disclosure may tend to be convoluted, so that it becomes difficult to understand and bias the true meaning of the information disclosed so that misreporting can be hidden by the CEO.

On the other hand, from a positive relationship point of view, Wong et al. (2011) document that the CEO's fWHR is positively related to firm profitability, especially in less cognitively complex firms. They also argue that CEOs with high fWHR showed more cooperative behavior to employees and subordinates to compete against other firms. A more masculine-faced CEO will try to occupy a dominant position in a competition (Kamiya et al., 2019; Sherman et al., 2016). The CEO with a masculine face will do everything to win the competition, including presenting firm reports that are easy to read and understand to present an excellent signal to investors regarding its condition. This is done to attract investors to invest their funds in the firm, which can then be used to finance its activities.

H₁: CEO facial masculinity has a relationship with the level of readability of analysis reports and management discussions.

METHODS

Samples and Data Sources

The initial sample in this study was 5,710 firm-years from non-financial firms listed on the Indonesia Stock Exchange from 2010 – 2019. The sample selection was carried out by purposive sampling method by excluding 4,141 firm-year variables that were incomplete, and firms with the gender of CEO is a woman. Based on previous research, the facial width-to-height ratio validates masculinity only for the male sex (Kamiya et al., 2019). The final sample used in this study included 1,569 observations. We resized all continuous variables at the 1st and 99th percentiles to reduce the effect of unwanted outliers. The distribution of data from all samples has been summarized in Table 1.

This research utilizes secondary data. Data related to the masculinity of the CEO's face are obtained through photos of the CEO contained in the annual report, firm website, and Google Image. Data related to the level of readability of the report were obtained through the firm's annual report for the analysis and management discussion section. CEO busyness data were obtained from the Bloomberg database. Meanwhile, financial data were obtained through the OSIRIS database and financial reports.

Table 1 Panel A shows that the largest sample distribution in this study is in the manufacturing industry (SIC code 2) with a total of 194 observations (43.50%) having more masculine-faced CEOs. While the service industry (SIC code 8) is the smallest sample distribution in this study with a total of 19 observations having more masculine-faced CEO (95%). On the other hand, Table 1 Panel B documents that the research sample is dominated by data from 2018 with a total of 254 firm-year observations, consisting of 137 firm-years with more masculine-faced CEOs and 117 firm-years with less masculine-faced CEOs. While the smallest sample is data from 2019 with 43 firm-years.

Table 1. Sample Distribution

Panel A: Breakdown of observations by industry							
SIC	Industry	More masculine-faced CEO		Less masculine-faced CEO		Total	
		n	%	n	%	n	%
0	Agriculture, Forestry and Fisheries	17	26.15%	48	73.85%	65	100%
1	Mining & Constuction	151	60.64%	98	39.36%	249	100%
2	Manufacturing	194	43.50%	252	50.50%	446	100%
3	Manufacturing	144	50.35%	142	49.65%	286	100%
4	Transportation, Communications, Electric, Gas, & Sanitary Service	120	49.59%	122	50.41%	242	100%
5	Wholesale & Retail	70	54.69%	58	45.31%	128	100%
7	Services	54	40.60%	79	59.40%	133	100%
8	Services	19	95%	1	5%	20	100%
	Total	769	49.01%	800	50.99%	1,569	100%

Panel B: Breakdown of observations by year

Year	More masculine-faced CEO		Less masculine-faced CEO		Total	
	n	%	n	%	n	%
2010	46	43.81%	59	56.19%	105	100%
2011	53	42.40%	72	57.60%	125	100%
2012	64	45.07%	78	54.93%	142	100%
2013	59	43.07%	78	56.93%	137	100%
2014	78	50.32%	77	49.68%	155	100%
2015	97	45.97%	114	54.03%	211	100%
2016	89	52.05%	82	47.95%	171	100%
2017	117	51.77%	109	48.23%	226	100%
2018	137	53.94%	117	46.06%	254	100%
2019	29	67.44%	14	32.56%	43	100%
	769	49.01%	800	50.99%	1,569	100%

Notes: This table shows the data distribution from the 1,569 firm-years used as the sample in this study. Panel A is a sample distribution based on eight groups according to the SIC code of each industry in firms that have more masculine-faced CEO (CEOs with above-median fWHR) and less masculine-faced CEO (CEOs with below-median fWHR). Meanwhile, Panel B is a sample distribution based on year.

Variable Definition and Measurement

CEO facial masculinity (MASCULINITY) was the independent variable in this study, which was proxied by a dummy of facial width-to-height ratio (fWHR) (Jia et al., 2014; Kamiya et al., 2019). A value of 1 is given if fWHR shows a value above the median of all samples and 0 otherwise. In full, an explanation regarding the measurement of CEO facial masculinity can be seen in Appendix 2.

We used the level of readability of the management discussion and analysis report (READ) as the dependent variable. Readability is the level of ease with which a piece of writing can be understood and understood (Lo et al., 2017). The variable level of readability of the Management Discussion and Analysis report was measured using the Flesch-Kincaid Readability Index (FKR_READ). As a robustness test, we also use the Gunning-Fog Readability Index (GF_READ) and the Coleman-Liau Readability Index (CL_READ) as proxies for the level of readability. FKR_READ states that the higher the value of a text, the easier the text is to understand. A complex or polylabeled word is a word that has three or more syllables (syllables). GF_READ and CL_READ state that the higher the score, the more difficult the text is to understand. Before processing the data using STATA software, the GF_READ and CL_READ values obtained will be multiplied by negative 1 (-1) to facilitate reading and interpretation of the results. The readability score calculation for each index is done by copying all the words in the analysis report and management discussion section in the Notepad application. The file.txt format is obtained and then inputted into the Readability application, often used in the linguistic field to get the readability value. The following is the formula for calculating the readability score used in this study:

$$\begin{aligned}
 \text{KR_READ} &= 206.835 - 1.015 \left(\frac{\text{total words}}{\text{total sentences}} \right) - 84.6 \left(\frac{\text{total syllables}}{\text{total words}} \right) \\
 \text{GF_READ} &= 0.4 \times \left(\left(\frac{\text{total words}}{\text{total sentences}} \right) - 100 \left(\frac{\text{complex word count}}{\text{total words}} \right) \right) \\
 \text{CL_READ} &= 5.89 \left(\frac{\text{total characters}}{\text{total words}} \right) - 29.5 \left(\frac{\text{total sentences}}{\text{total words}} \right) - 15.8
 \end{aligned}$$

We followed previous research by adding some control variables. Profitability (ROA) in this study was obtained from Return on Assets, namely the distribution of net income by the firm's total assets in the current year (Ginesti et al., 2018). Leverage (LEV) is the total long-term debt divided by total assets (Ginesti et al., 2018). Firm size (FSIZE) is the natural logarithm of the firm's total assets (Roiston & Harymawan, 2020). The size of board commissioners (COMSIZE) is obtained from the number of people who serve on the board of commissioners (Sucahyati et al., 2020). Meanwhile, the size of the board of directors (DIRSIZE) is the number of people who serve on the board of directors (Sucahyati et al., 2020). Firm age (FAGE) is the firm's age as measured by the the number of years since the firm was founded (Li, 2008; Roiston & Harymawan, 2020). While the size of KAP (BIG4) is a dummy variable, a value of 1 is given if the firm is audited by KAP BIG4 and 0 otherwise. Moreover, we also include the dummy variable, a value of 1 means that the CEO is categorized as busy because he holds two or more positions and 0 otherwise (BUSY) and CEO age in the current year (AGE). All variables used in this study have been summarized in Appendix 1.

Research Design

We use cluster regression with year and industry fixed effects of testing the hypothesis using STATA 17.0 software. The results of data collection will be processed using statistical descriptive, Pearson correlation, two-sample independent t-test, regression testing for the primary analysis, and additional analysis. Furthermore, we also conduct robustness tests in several ways. First, we use two different readability proxies besides FKR_READ: the Gunning-Fog Readability Index (GF_READ) and the Coleman-Liau Readability Index (CL_READ). Second, we use the propensity score matching method. Third, we also conducted a Heckman two-stage test. The following are the problems of the primary regression in this study:

$$\begin{aligned}
 \text{READ}_{i,t} = & \beta_0 + \beta_1 \text{MASCULINITY}_{i,t} + \beta_2 \text{BUSY}_{i,t} + \beta_3 \text{AGE}_{i,t} + \beta_4 \text{DIRSIZE}_{i,t} + \beta_5 \text{COMSIZE}_{i,t} + \\
 & \beta_6 \text{BIG4}_{i,t} + \beta_7 \text{ROA}_{i,t} + \beta_8 \text{LEV}_{i,t} + \beta_9 \text{SIZE}_{i,t} + \beta_{10} \text{FIRMAGE}_{i,t} + \beta_{11} \text{INDUSTRY}_{i,t} + \\
 & \beta_{12} \text{YEAR}_{i,t} + \varepsilon_{i,t} \dots \dots \dots (1)
 \end{aligned}$$

Table 2. Descriptive Statistics

	N	Mean	SD	p25	Median	p75	Max	Min
FKR READ	1.569	29.089	9.130	24.604	29.205	34.021	50.653	-16.643
GF READ	1.569	-18.841	2.265	-20.256	-18.994	-17.676	-12.066	-24.699
CL READ	1.569	-17.081	1.381	-17.77	-17.042	-16.252	-13.892	-22.694
MASCULINITY	1.569	.49	0.500	0	0	1	1	0
BUSY	1.569	.502	0.500	0	1	1	1	0
AGE	1.569	53.509	9.225	48	53	59	79	33
DIRSIZE	1.569	4.873	1.887	3	5	6	11	2
COMSIZE	1.569	4.277	1.743	3	4	5	10	2
BIG4	1.569	.405	0.491	0	0	1	1	0
ROA	1.569	.038	0.092	.002	.033	.077	.372	-.29
LEV	1.569	.196	0.177	.052	.145	.289	.85	.003
FSIZE	1.569	28.664	1.559	27.677	28.642	29.704	32.239	24.708
FIRMAGE	1.569	32.314	19.014	20	30	40	114	5

Notes: This table shows descriptive statistics of 1.569 firm-year samples of non-financial firms listed on the IDX in 2010-2019. This descriptive statistic shows the data after winsorizing at 1 and 99 percent.

RESULTS AND DISCUSSION

Descriptive Statistics and Univariate Analysis

Based on Table 2, the age of the oldest CEO in this study was 79 years old. At the same time, the age of the youngest CEO in this study was 33 years old according to PT Wilton Makmur Indonesia Tbk. Table 3 also shows that the FKR_READ value ranges between -16.643 to 50.653. GF_READ has a range of values between -24.699 and -12.066. In comparison, CL_READ has a range of values from -22.694 to -13.892. Table 2 also shows that as many as 49% of firms in this study sample have a masculine-faced CEO. The number of busy CEOs because they hold two or

Table 3. Two-Sample Independent T-Test

	Mean of more masculine-faced CEO	Mean of less masculine- faced CEO	Coef	t-value
FKR_READ	29.246	28.938	0.307	0.666
GF_READ	-18.908	-18.776	-0.132	-1.156
CL_READ	-17.041	-17.119	0.079	1.130
BUSY	0.494	0.510	-0.016	-0.627
AGE	51.560	55.381	-3.821***	-8.381
DIRSIZE	4.874	4.871	0.003	0.027
COMSIZE	4.260	4.293	-0.032	-0.368
BIG4	0.398	0.412	-0.015	-0.588
ROA	0.041	0.036	0.004	0.898
LEV	0.205	0.187	0.018**	2.030
FSIZE	28.793	28.540	0.253***	3.225
FIRMAGE	31.189	33.396	-2.208**	-2.302

Notes: Table 3 documents the results of a two-sample independent t-test on the characteristics of firms that have more and less masculine-faced CEO. The variable MASCULINITY is used as a treatment variable which divides the sample into two. ** $p < 0.05$, *** $p < 0.01$

Table 4. Matrix of Pearson Correlation

Panel A: From FKR_READ to DIRSIZE							
	[1]	[2]	[3]	[4]	[5]	[6]	[7]
[1] FKR_READ	1.000						
[2] GF_READ	0.810*** (0.000)	1.000					
[3] CL_READ	0.682*** (0.000)	0.466*** (0.000)	1.000				
[4] MASCULINITY	0.017 (0.505)	-0.029 (0.248)	0.029 (0.259)	1.000			
[5] BUSY	-0.004 (0.874)	0.001 (0.962)	-0.009 (0.734)	-0.016 (0.530)	1.000		
[6] AGE	0.062** (0.013)	0.094*** (0.000)	0.035 (0.169)	-0.207*** (0.000)	0.090*** (0.000)	1.000	
[7] DIRSIZE	-0.104*** (0.000)	-0.095*** (0.000)	-0.066*** (0.009)	0.001 (0.978)	0.057** (0.024)	0.071*** (0.005)	1.000
[8] COMSIZE	-0.148*** (0.000)	-0.163*** (0.000)	-0.088*** (0.001)	-0.009 (0.713)	0.101*** (0.000)	0.041 (0.105)	0.496*** (0.000)
[9] BIG4	-0.087*** (0.001)	-0.102*** (0.000)	-0.051** (0.043)	-0.015 (0.557)	0.020 (0.436)	-0.074*** (0.003)	0.285*** (0.000)
[10] ROA	-0.019 (0.459)	-0.025 (0.331)	-0.019 (0.444)	0.023 (0.369)	-0.002 (0.940)	-0.048* (0.060)	0.201*** (0.000)
[11] LEV	-0.006 (0.807)	-0.031 (0.226)	0.019 (0.461)	0.051** (0.043)	0.120*** (0.000)	-0.027 (0.289)	0.020 (0.439)
[12] FSIZE	-0.173*** (0.000)	-0.184*** (0.000)	-0.146*** (0.000)	0.081*** (0.001)	0.144*** (0.000)	0.020 (0.426)	0.495*** (0.000)
[13] FIRMAGE	-0.015 (0.542)	-0.014 (0.587)	0.033 (0.198)	-0.058** (0.021)	0.013 (0.619)	0.173*** (0.000)	0.144*** (0.000)
Panel B: From COMSIZE to FIRMAGE							
	[8]	[9]	[10]	[11]	[12]	[13]	
[8] COMSIZE	1.000						
[9] BIG4	0.332*** (0.000)	1.000					
[10] ROA	0.144*** (0.000)	0.252*** (0.000)	1.000				
[11] LEV	0.048* (0.056)	-0.062** (0.014)	-0.206*** (0.000)	1.000			
[12] FSIZE	0.514*** (0.000)	0.371*** (0.000)	0.120*** (0.000)	0.229*** (0.000)	1.000		
[13] FIRMAGE	0.251*** (0.000)	0.100*** (0.000)	0.110*** (0.000)	-0.119*** (0.000)	0.031 (0.221)	1.000	

Notes: Table 4 shows the results of the Pearson Correlation of 1.569 firm-years used as the research sample. This analysis uses data after winsorizing at 1 and 99 percent. p -values in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

more positions in this study is higher than that of not busy CEOs, 50.2% of the entire research sample. The average firm in the research sample has five directors and four commissioners. In this

study, 40.5% of sample firms were audited by a Public Accounting Firm, which is included in the list of KAP BIG 4 in Indonesia. In addition, the firms in this research sample have an average ROA of 0.038, a leverage ratio of 0.196, a firm size of 28.664, and, on average, have been established for approximately 32 years.

Table 3 shows the differences in the characteristics of the average firm led by a more masculine-faced CEOs and less masculine-faced CEOs. Firms with more masculine-faced CEOs are statistically significantly more likely to be found in firms with a high level of leverage and are large in size than firms with less masculine-faced CEOs. Other results show that firms with more masculine-faced CEOs are statistically significant more likely to have younger CEOs. As for the firm's age, firms with more masculine-faced CEOs are more commonly found in newly established firms and are statistically significant.

Table 5. CEO Facial Masculinity and Readability of MD&A

	(1) FKR_READ	(2) GF_READ	(3) CL_READ
MASCULINITY	1.088** (2.52)	0.083 (0.83)	0.195** (2.63)
BUSY	0.715 (1.62)	0.172 (1.49)	0.081 (1.07)
AGE	0.070*** (2.93)	0.022*** (3.34)	0.007 (1.66)
DIRSIZE	-0.165 (-1.17)	-0.014 (-0.37)	-0.004 (-0.23)
COMSIZE	-0.438*** (-3.47)	-0.130*** (-3.83)	-0.045* (-1.86)
BIG4	0.082 (0.17)	-0.126 (-1.03)	0.056 (0.86)
ROA	-0.255 (-0.11)	0.034 (0.05)	-0.362 (-0.87)
LEV	1.667 (1.37)	0.131 (0.40)	0.434* (1.81)
FSIZE	-0.680*** (-3.65)	-0.145*** (-3.18)	-0.115*** (-3.62)
FIRMAGE	-0.013 (-1.22)	-0.005 (-1.66)	0.003 (1.13)
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
Constant	52.169*** (10.49)	-13.994*** (-10.61)	-13.887*** (-15.68)
R ²	0.108	0.108	0.082
Adjusted R ²	0.093	0.093	0.067
N	1569	1569	1569

Notes: Table 5 documents the results of cluster regression with fixed effect testing. This table shows the relationship between CEO facial masculinity and the readability of MD&A reports. t statistics in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

The results of the Pearson correlation test in Table 4 show that there is no statistically significant relationship between MASCULINITY and all proxies for the readability of MD&A reports. It is documented that, when the test was carried out only by looking at the relationship between MASCULINITY and the level of readability of the MD&A report without considering any other factors (in this case the control variable), there was no significant relationship between the two variables. This makes us carry out a deeper research by conducting a multivariate analysis by considering the role of the control variable in the relationship between the two variables. Table 4 also shows a significant positive relationship between CEO age (AGE) and MD&A report readability on FKR_READ (coef = 0.062**) and GF_READ (coef = 0.094***) proxies. The older CEO age has a strong relationship with an increase in the readability of analysis reports and management discussions that are easier to read and understand. On the other hand, the variables DIRSIZE, COMSIZE, BIG4, and FSIZE were each statistically proven to have a significant negative relationship with all MD&A report readability proxies.

Baseline Regression

Table 5 shows the results in line with the hypothesis built in this study. The results showed a statistically significant positive relationship between CEO facial masculinity and two proxies for the readability of MD&A reports, namely FKR_READ and CL_READ. This is indicated by a coefficient value of 1.088 (t=2.52) for the FKR_READ proxy and a coefficient of 0.195 (t=2.63) with a significance level of 5%. This means that masculine-faced CEOs are statistically proven to increase the readability of MD&A reports so that reports will be easier to read and understand.

Wong et al. (2011) found that the fWHR level of CEOs is positively related to firm profitability, especially in firms that are less cognitively complex. They also argue that CEOs with high fWHR showed more cooperative behavior to employees and subordinates to compete against other firms. This statement is also supported by the findings of Stirrat and Perrett (2012). They reported that men with high fWHR tend to cooperate more with other group members in a competition setting between groups to win the competition against other groups. This is related to the dominant social character commonly found in men with high testosterone. A more masculine-faced CEO will try to occupy a dominant position in a competition (Kamiya et al., 2019; Sherman et al., 2016). These characteristics will make CEOs with masculine faces try to give good signals to investors or users of firm reports. The CEO will try to present and manage the language presented in firm reports (especially MD&A reports) so that report users easily understand them. This is done to attract investors to invest in the firm, where the capital can be used to fund the firm's business strategy and occupy a dominant position in the industry. These results also prove that CEOs with masculine faces tend to express their income to the point without being complicated, so it can be concluded that CEOs with masculine faces tend to produce analysis reports and management discussions that are easy to read and understand.

Robustness Test

Propensity Score Matching. To overcome the possibility of endogeneity problems in the research model, we conducted a robustness test, namely propensity score matching (PSM). PSM is used to control firm-level characteristics as developed by Rosenbaum and Rubin (1983). We matched firms with masculine-faced CEOs to a control set of firms with non-masculine-faced CEOs to evaluate the effect of treatment. We estimate the equation and apply the condition at the highest propensity caliper to remove different matched pairs if the difference in propensity scores (probability) is more significant than 0.001. The PSM test results in Table 6 show robust results with the previously tested baseline regression. This result is robust for two proxies for legibility, namely FKR_READ with a coefficient of 1.427 (t=2.93) and CL_READ with a coefficient of 0.234 (t=2.60). A CEO with a masculine face is statistically proven to produce a good level of readability of MD&A reports so that they are easy to read and understand.

Heckman Two-Stage. Not only did the robustness test use the PSM method, but we also tested the robustness test using the Heckman two-stage method. In the Heckman two-stage test,

Table 6. Propensity Score Matching

	(1)	(2)	(3)
	FKR_READ	GF_READ	CL_READ
MASCULINITY	1.427*** (2.93)	0.141 (1.35)	0.234** (2.60)
Control Variables	Included	Included	Included
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
Constant	56.644*** (8.76)	-12.814*** (-7.86)	-13.579*** (-12.59)
R ²	0.100	0.100	0.078
Adjusted R ²	0.078	0.078	0.056
N	1092	1092	1092

Notes: Table 6 documents the propensity score matching test results as one of the robustness test techniques carried out in this study. t statistics in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

we used AVEMASCULINITY as an instrument variable which is thought to have a relationship with the dependent variable, only through the independent variable (Harymawan et al., 2021; Nasih et al., 2019). AVEMASCULINITY is the average value of the MASCULINITY variable. The selection of this instrument variable is based on the idea that, when the firm is in an environment (in the same industry and year) dominated by firms with masculine-faced CEOs, the firm will also have a tendency to choose the same strategy. The strategy is to choose a masculine-faced CEOs to lead the firm's activities. The following is the equation used to test the Heckman two-stage in this study:

$$\text{MASCULINITY}_{i,t} = \beta_0 + \beta_1 \text{AVEMASCULINITY}_{i,t} + \beta_2 \text{BUSY}_{i,t} + \beta_3 \text{AGE}_{i,t} + \beta_4 \text{DIRSIZE}_{i,t} + \beta_5 \text{COMSIZE}_{i,t} + \beta_6 \text{BIG4}_{i,t} + \beta_7 \text{ROA}_{i,t} + \beta_8 \text{LEV}_{i,t} + \beta_9 \text{FSIZE}_{i,t} + \beta_{10} \text{FIRMAGE}_{i,t} + \beta_{11} \text{INDUSTRY}_{i,t} + \beta_{12} \text{YEAR}_{i,t} + \varepsilon_i \dots \dots \dots (2)$$

$$\text{READ}_{i,t} = \beta_0 + \beta_1 \text{MASCULINITY}_{i,t} + \beta_2 \text{MILLS}_{i,t} + \beta_3 \text{BUSY}_{i,t} + \beta_4 \text{AGE}_{i,t} + \beta_5 \text{DIRSIZE}_{i,t} + \beta_6 \text{COMSIZE}_{i,t} + \beta_7 \text{BIG4}_{i,t} + \beta_8 \text{ROA}_{i,t} + \beta_9 \text{LEV}_{i,t} + \beta_{10} \text{FSIZE}_{i,t} + \beta_{11} \text{FIRMAGE}_{i,t} + \beta_{12} \text{INDUSTRY}_{i,t} + \beta_{13} \text{YEAR}_{i,t} + \varepsilon_{i,t} \dots \dots \dots (3)$$

Equation 2 is used to test first-stage probit regression, while Equation 3 is used to test second-stage probit regression. The MILLS variable in this study is the inverse Mills ratio, which results from the probit regression between the independent variables and the instrument in equation 2. Therefore, the MILLS value in the second-stage test must show an insignificant value to meet the ideal requirements for the Heckman two-stage test. The results of the Heckman two-stage test are presented in Table 7.

The ideal conditions in the Heckman two-stage test have been met for the primary dependent variable in Panel B, namely FKR_READ, which shows an insignificant MILLS value. The results of the Heckman two-stage test show that the results are robust and in line with the tests on the baseline regression. Furthermore, these results are robust for testing on two proxies of readability of MD&A reports, namely FKR_READ with a coefficient of 1.081 (t=2.49) and CL_READ with a coefficient of 0.193 (t=2.62), significant at the 5% level.

Additional Analysis

The Moderating Role of Busy and Age of CEO. We analyze the interaction of busy and age

Table 7. Heckman Two-Stage

Panel A: First Stage			
	(1)		
	MASCULINITY		
MASCULINITY			
AVEMASCULINITY		3.219***	
		(4.58)	
Control Variables		Included	
Industry Fixed Effect		Yes	
Year Fixed Effect		Yes	
Constant		-2.179***	
		(-2.70)	
Pseudo R ²		0.077	
N		1569	
Panel B: Second Stage			
	(1)	(2)	(3)
	FKR_READ	GF_READ	CL_READ
MASCULINITY	1.081**	0.081	0.193**
	(2.49)	(0.82)	(2.62)
MILLS	10.541	2.035	2.270**
	(1.21)	(1.01)	(2.05)
Control Variables	Included	Included	Included
Industry Fixed Effect	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes
Constant	34.662**	-17.373***	-17.658***
	(2.26)	(-4.61)	(-8.88)
R ²	0.109	0.108	0.084
Adjusted R ²	0.094	0.093	0.068
N	1569	1569	1569

Notes: Table 7 shows the results of the Heckman two-stage test from the 1,569 firm-year research sample. Panel A documents the first-stage probit regression test results, and Panel B documents the second-stage probit regression test results. This test includes all controls, industry-fixed effects, and year-fixed effects. t statistics in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

CEO in additional analysis to enrich the results of this study. Equation 2 describes the interaction of busy CEO in the relationship between CEO facial masculinity and the level of readability of MD&A reports while equation 3 is used to show the interaction of the age of the CEO in the relationship between the CEO's facial masculinity and the level of readability of MD&A reports.

$$\begin{aligned}
 READ_{i,t} = & \beta_0 + \beta_1 MASCULINITY_{i,t} * BUSY_{i,t} + \beta_2 MASCULINITY_{i,t} + \beta_3 BUSY_{i,t} + \beta_4 AGE_{i,t} + \beta_5 DIRSIZE_{i,t} \\
 & + \beta_6 COMSIZE_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 ROA_{i,t} + \beta_9 LEV_{i,t} + \beta_{10} FSIZE_{i,t} + \beta_{11} FIRMAGE_{i,t} + \beta_{12} INDUSTRY_{i,t} \\
 & + \beta_{13} YEAR_{i,t} + \epsilon_{i,t} \dots \dots \dots (4)
 \end{aligned}$$

$$\begin{aligned}
 READ_{i,t} = & \beta_0 + \beta_1 MASCULINITY_{i,t} * AGE_{i,t} + \beta_2 MASCULINITY_{i,t} + \beta_3 BUSY_{i,t} + \beta_4 AGE_{i,t} + \beta_5 DIRSIZE_{i,t} \\
 & + \beta_6 COMSIZE_{i,t} + \beta_7 BIG4_{i,t} + \beta_8 ROA_{i,t} + \beta_9 LEV_{i,t} + \beta_{10} FSIZE_{i,t} + \beta_{11} FIRMAGE_{i,t} + \beta_{12} INDUSTRY_{i,t} \\
 & + \beta_{13} YEAR_{i,t} + \epsilon_{i,t} \dots \dots \dots (5)
 \end{aligned}$$

Table 8. The Moderating Role of Busy and Age of CEO

	(1)	(2)	(3)	(4)	(5)	(6)
	FKR_ READ	GF_ READ	CL_ READ	FKR_ READ	GF_ READ	CL_ READ
MASCULINITY*BUSY	-2.146** (-2.51)	-0.432* (-1.95)	-0.188 (-1.42)			
MASCULINITY*AGE				-0.096** (-2.33)	-0.027** (-2.23)	0.001 (0.20)
MASCULINITY	2.165*** (3.07)	0.300* (1.83)	0.289*** (2.66)	6.219*** (2.81)	1.507** (2.31)	0.130 (0.42)
Control Variables	Included	Included	Included	Included	Included	Included
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	51.457*** (10.39)	-14.137*** (-10.62)	-13.950*** (-15.84)	49.604*** (9.94)	-14.706*** (-10.92)	-13.855*** (-15.18)
R ²	0.112	0.110	0.083	0.111	0.110	0.082
Adjusted R ²	0.096	0.094	0.067	0.095	0.095	0.066
N	1569	1569	1569	1569	1569	1569

Notes: Table 8 reports the interaction of CEO busy and age in the relationship between CEO facial masculinity and readability of MD&A reports. t statistics in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

Table 8 shows that CEO busyness can significantly weaken the relationship between CEO facial masculinity and the readability of MD&A reports with the coefficient value of the MASCULINITY*BUSY variable of -2.146 (t=-2.51) for the FKR_READ proxy with a significance of 5% and a coefficient of -0.432. (t=-1.95) for the GF_READ proxy. CEOs who have masculine faces and are busy because they hold more than one position are proven to have a significantly low level of readability of MD&A reports or are difficult to read and understand. The CEO will try to keep giving a good signal to investors and other users of the report so that the firm's value is maintained properly. The CEO will also try to hide any bad signals that may be happening to the firm. Busy CEOs exacerbate this condition because they have positions in other firms. Busy CEOs tend to be less focused on making decisions because of the many problems that must be faced due to the many positions that are their responsibility. This raises the possibility that the MD&A report it produces is poor and convoluted in conveying information.

Furthermore, Table 8 also shows that CEO age can significantly weaken the relationship between CEO facial masculinity and the readability of MD&A reports. In the FKR_READ and GF_READ proxies, the coefficient values for each proxy are -0.096 (t=-2.33) and -0.027 (t=-2.23) significant at 5%. This means that the older the masculine-looking CEO leads a firm, the lower the readability of the MD&A report. Hodges-Simeon et al. (2018) argue that age can moderate the relationship between testosterone levels and fWHR levels. This is supported by the findings of Feldman et al. (2002), which states that, based on the results of clinical studies, testosterone levels in men will decrease with age. This, of course, will also affect the characteristics of a CEO and the decisions he makes.

Sub-sample High and Low Growth. The following additional analysis divides the research sample into two sub-samples, namely high and low growth. First, we divide the sample into firms in low-growth and high-growth industries based on the OECD Economic Survey of Indonesia. We then re-estimated the equation to examine the relationship between masculine-looking

Table 9. Regression-Based on Growth Sample Division

	High Growth			Low Growth		
	(1)	(2)	(3)	(4)	(5)	(6)
	FKR_READ	GF_READ	CL_READ	FKR_READ	GF_READ	CL_READ
MASCULINITY	1.335*	0.232	0.323***	0.995*	0.015	0.125
	(1.88)	(1.38)	(2.93)	(1.76)	(0.11)	(1.22)
Control Variables	Included	Included	Included	Included	Included	Included
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	56.536***	-12.396***	-11.310***	49.225***	-15.215***	-14.998***
	(5.70)	(-5.22)	(-6.21)	(9.18)	(-9.94)	(-17.38)
R ²	0.114	0.114	0.112	0.094	0.101	0.072
Adjusted R ²	0.078	0.078	0.075	0.074	0.082	0.051
N	588	588	588	981	981	981

Notes: Table 9 documents the additional analysis results by dividing the research sample into two sub-samples, namely high growth and low growth. t statistics in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

CEOs and the readability of MD&A reports. The results in Table 9 show that, as a primary proxy for MD&A readability, the positive relationship between masculine-faced CEOs and MD&A readability is strong for both sub-samples. Although both sub-samples are statistically significant, this relationship is more profound in firms in high-growth industries. This is evidenced by the significance of the relationship between masculine-faced CEOs on two proxies of MD&A readability, namely FKR_READ (coefficient of 1.335 and significant at the 10% level) and CL_READ (coefficient of 0.323 and significant at 1% level).

Sub-sample Loss and Profit. In an additional analysis, we also try to test by dividing the sample into firms that experience losses and generate profits. The test results in Table 10 show that the positive relationship of masculine-faced CEOs to the readability of MD&A reports is

Table 10. Regression-Based on Loss and Profit Sub-Sample

	Profit			Loss		
	(1)	(2)	(3)	(4)	(5)	(5)
	FKR_READ	GF_READ	CL_READ	FKR_READ	GF_READ	CL_READ
MASCULINITY	0.857*	0.071	0.165*	1.755	0.119	0.257
	(1.93)	(0.59)	(1.91)	(1.18)	(0.42)	(1.17)
Control Variables	Included	Included	Included	Included	Included	Included
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Constant	48.302***	-15.005***	-14.071***	60.205***	-10.939***	-13.345***
	(9.30)	(-10.02)	(-14.00)	(4.94)	(-3.81)	(-6.75)
R ²	0.119	0.121	0.089	0.134	0.155	0.102
Adjusted R ²	0.100	0.102	0.069	0.065	0.087	0.030
N	1230	1230	1230	339	339	339

Notes: Table 10 shows the additional analysis results by dividing the research sample into two sub-samples, namely loss and profit. t statistics in parentheses. * p < 0.1, ** p < 0.05, *** p < 0.01

vital when the firm makes a profit in that period. This is because the profits generated by the firm can be used as material for managing sentences in such a way that they are easy to read and understand to win the competition and attract as many investors as possible with the profits that the firm can generate. Disclosure of firm profits can also be good news for firm stakeholders, especially for investors.

CONCLUSIONS

This study aims to examine the relationship between CEO facial masculinity and the readability of MD&A reports on 1,569 firm-years of non-financial firms listed on the Indonesia Stock Exchange for 2010-2019. Based on the analysis of the results and discussion, firms led by CEOs who have masculine faces are statistically proven to significantly increase the readability of MD&A reports so that reports will be easier to read and understand. This is related to the dominant social character (wants always to win the competition), commonly found in men with high testosterone levels. However, this result is different when busy or elderly CEOs lead firms. CEO busyness is statistically significant at weakening the relationship between CEO facial masculinity and the readability of MD&A reports, so firms led by busy, masculine-faced CEOs tend to produce MD&A reports that are difficult to read and understand. Likewise, CEO age, which is proven to be statistically significant, can weaken the relationship between CEO facial masculinity and readability of MD&A reports on the Flesch-Kincaid Readability Index and Gunning-Fog Readability Index proxies. That is, the older the masculine-faced CEO who leads a firm, the statistically significant tendency to have a poor level of readability of MD&A reports.

In terms of practical contributions, the study enhances our understanding of the influence of CEO facial masculinity on the readability of MD&A reports. It provides valuable insights for firms to recognize the potential impact of CEO characteristics on communication strategies. Firms can consider the readability of their reports as a crucial aspect of transparency and stakeholder engagement. The findings indicate that firms led by CEOs with more masculine faces tend to produce MD&A reports that are easier to read and understand. This valuable insight can guide companies in CEO selection and the development of leadership programs, enabling them to prioritize CEO traits that enhance communication effectiveness and readability to better fulfill the needs of stakeholders. Additionally, the study highlights the moderating effect of CEO busyness and age on the relationship between facial masculinity and report readability. This awareness prompts firms to consider factors such as workload and age-related considerations when evaluating the readability of their MD&A reports. It emphasizes the importance of allocating appropriate resources, support, and training to busy or older CEOs to ensure effective communication.

Regarding theoretical contributions, the study extends the upper echelon theory by examining the impact of CEO facial masculinity on the readability of MD&A reports. This research expands our understanding of how CEO characteristics, influenced by testosterone levels, can shape communication strategies and enhance transparency within organizations. By specifically focusing on the relationship between CEO facial masculinity and report readability, the study contributes to the existing body of literature exploring the link between CEO attributes and communication effectiveness. Moreover, it provides empirical evidence that highlights the association between physical characteristics and communication outcomes, shedding light on the potential influence of non-verbal cues in the business context.

There are several limitations in this study. This limitation can be used for further research to perfect research with similar topics. First, this study measures the facial width-to-height ratio using ImageJ software, where the measurement process is still done manually. Future studies can use Artificial Intelligence (AI) in measuring the value of facial width-to-height ratio as in the study by Kamiya et al. (2019). Second, this study only uses three proxies of readability. Further research can use the robustness test of two other proxies of readability level, namely Flesch-Kincaid Grade Level and SMOG Index.

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