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CEO Characteristics and Enterprise Risk Management: The Moderating Role of ESG Disclosure in Indonesian Agro-Industrial Firms

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ABSTRACT
This study examines the effect of CEO characteristics on Enterprise Risk Management (ERM) implementation and investigates the moderating role of Environmental, Social, and Governance (ESG) disclosure in Indonesian agro-industrial firms. This study argues that executive demographic and professional attributes shape enterprise risk management practices, while ESG disclosure functions as a governance mechanism that may condition this relationship. Using a quantitative approach, the sample consists of 51 firm-year observations of agro-industrial companies listed on the Indonesia Stock Exchange during 2020–2022. CEO characteristics are constructed using Principal Component Analysis (PCA) based on age, education background, prior executive experience, and tenure. ERM is measured using a composite index, while ESG disclosure is assessed through a disclosure index. The results show that CEO characteristics positively and significantly influence ERM implementation, indicating that executive attributes play a crucial role in shaping integrated risk management structures. Furthermore, ESG disclosure significantly moderates the relationship between CEO characteristics and ERM with a negative interaction effect, suggesting a governance substitution effect. These findings contribute to the literature by integrating an emerging market agro-industrial context. The study highlights the strategic importance of leadership quality and ESG institutionalization in strengthening corporate resilience against environmental and business uncertainties.

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INTRODUCTION

Enterprise Risk Management (ERM) is an integrated risk management system designed to identify, assess, and control various strategic, operational, financial, and non-financial risks that may affect the achievement of organizational objectives. Over the past two decades, ERM has evolved from merely an internal control mechanism into a strategic instrument that contributes to firm value creation. Aldoseri (2025) demonstrates that the firm's behavior in managing the ERM depends on the characteristic of CEO, CEO with power and over confidence will take more risks. Meanwhile, further analysis by Aldawsari et al. (2024) and Yahaya (2025) find that ERM implementation is positively associated with improved firm performance through the reduction of

undiversified risk exposure. In addition, Beasley et al. (2023) emphasizes that the effectiveness of risk management depends on the alignment between organizational structure and the firm's risk environment. These findings suggest that risk management is not merely an administrative function, but rather a strategic decision influenced by top-level leadership reflected by CEO.

The urgency of risk management becomes even more pronounced within the agro-industrial sector. This sector faces complex and multidimensional risks, including climate change exposure, global commodity price volatility, supply chain disruptions, trade regulatory uncertainty, and reputational pressures related to deforestation and sustainability issues. Farah et al. (2025) and Aksenko (2025) highlights that agriculture and agribusiness are among the most vulnerable sectors to climate change impacts and market uncertainty. In the Indonesian context—one of the world's leading producers of palm oil, rubber, and food commodities—agro-industrial firms operate under intense scrutiny from international investors regarding Environmental, Social, and Governance (ESG) disclosure (Difitri & Wijayanti, 2025). The literature indicates that firms with high environmental exposure tend to face greater systematic risk when failing to comply with global sustainability standards (Azar & Ulpah, 2024). This phenomenon requires management response in terms of ESG practices and disclosures to address stakeholders' interests (Reis et al., 2025). Therefore, effective risk management in the agro-industrial sector constitutes a critical dete rminant of long-term corporate stability and sustainability.

From the perspective of Upper Echelons Theory, corporate strategic decisions reflect the values, experiences, and risk preferences of top executives (Hambrick & Mason, 1984; Hambrick, 2007). As the highest decision-maker, the Chief Executive Officer (CEO) possesses substantial discretion in determining corporate risk policies. Demographic characteristics such as age, tenure, educational background, and professional experience shape the CEO's time orientation and risk tolerance. Jabbour et al. (2025) show that individual managerial styles significantly influence corporate policies. Trabert (2023) finds further that younger CEOs tend to adopt more aggressive risk-taking strategies, Atayah et al. (2022) and Darouichi et al. (2021) demonstrate that CEO tenure affects policy stability and risk-taking behavior. Meanwhile, Helmi (2026) & Mishra (2024) reveal that CEOs with relevant expertise backgrounds and board experience are more conservative in leverage and risk policies. Consequently, CEO characteristics may serve as a primary determinant of variation in corporate risk management practices, particularly in the agro-industrial sector, which is characterized by high environmental and social risk exposure.

However, the influence of CEO characteristics on risk management does not operate in isolation. Modern firms face increasing pressure to adopt sustainability practices through Environmental, Social, and Governance (ESG) disclosure. Based on Stakeholder Theory (Freeman, 1984) and Legitimacy Theory (Dowling & Pfeffer, 1975) firm must respond to stakeholder expectations to maintain legitimacy and secure access to strategic resources. ESG disclosure functions as a transparency mechanism that reduces information asymmetry and strengthens external monitoring of management.

Empirical evidence indicates that ESG performance is closely related to corporate risk. Ioannou & Serafeim (2023) as well as Nguyen & Nguyen (2026) find that existence of ESG affected the managerial effort to increase the firm value by managing the risk, firms with stronger ESG disclosure amplify the positive impact of enterprise risk management. Those studies conclude that in managing risk management, ESG can be a significant factor for firm managerial. Subsequently, Kuo et al. (2021) analyses that managerial traits determine how ESG performance is implemented and managerial traits also determine how firm manages its risk in business and stock market. Additionally, Yuniati (2026) finds that ESG risk triggers CEO in decision making based risk, CEOs with a business education background are able to reduce ESG risk. Syamsi & Hanggraeni (2025) indicate that ESG and ERM have strategic role for managerial and investor decision.

Within this context, ESG disclosure may function as a moderating variable in the relationship between CEO characteristics and corporate risk management. In firms with higher levels of ESG disclosure, stronger external monitoring pressures and stakeholder expectations may constrain CEO discretion in risk-taking decisions. Conversely, in firms with lower ESG disclosure, personal CEO characteristics may exert a more dominant influence on corporate risk policies. This mechanism is consistent with Agency Theory, which posits that governance and monitoring mechanisms limit managerial opportunistic behavior (Jensen & Meckling, 1976).

Although literature has advanced along two primary streams namely, CEO characteristics and ERM, ESG and ERM. These strands remain relatively fragmented. Studies on CEO characteristics rarely explicitly examine their implications for integrated corporate risk management. ESG research typically treats ESG as a direct determinant of risk or performance rather than as a governance mechanism interacting with executive characteristics in shaping risk policies. Moreover, most existing studies are conducted in developed countries with mature governance systems, while empirical evidence from the agro-industrial sector in emerging markets remains limited.

Addressing this gap, the present study integrates Upper Echelons Theory and Stakeholder Theory within a unified conceptual framework to explain how CEO characteristics influence enterprise risk management and how ESG disclosure moderates this relationship in Indonesian agro-industrial firms. Hence, the methodology in this study employs ESG as moderating variabel in the regression linear testing between CEO characteristic on ERM, spesifically in Indonesia agro-industrial industry. Prior studies have tested CEO characteristics separetely i.e age, education, experience, and tenure. This study offers simultaneous testing of those four characterictics by using Principal Component Analysis (PCA) in the regression.

This study aims to provide both theoretical and empirical contributions to the literature on risk management, corporate governance, and sustainability, particularly in sectors characterized by high environmental and social risk exposure. Hence, this study seeks to address the following research questions to what extent do CEO characteristics affect Enterprise Risk Management (ERM) implementation in Indonesian agro-industrial firms? and does ESG disclosure moderate the effect of CEO characteristics on ERM implementation in Indonesian agro-industrial firms?

LITERATURE REVIEW

Enterprise Risk Management

Enterprise Risk Management (ERM) represents an integrated approach to identifying, assessing, and managing risks that may affect the achievement of an organization's strategic objectives. The Committee of Sponsoring Organizations of the Treadway Commission defines ERM as a process influenced by the board of directors and management, applied in strategy-setting and across the organization to identify potential events that may affect the entity and to manage risk within acceptable tolerance levels (Espinosa-Jaramillo, 2024). This concept emphasizes that risk is not merely the possibility of loss, but rather uncertainty that may influence long-term value creation.

Within the context of the Indonesian agro-industrial sector, risk management possesses complex dimensions, as the industry is highly dependent on natural conditions, climate stability, land productivity, and community-based supply chain sustainability. Leite de Almeida (2025) highlights that natural resource–based industries face physical risks resulting from climate change, transition risks arising from environmental policies, and social risks related to land conflicts and community pressures. Moreover, evolving domestic regulations and increasing international market pressure concerning deforestation and carbon emissions further intensify the complexity of risks faced by agro-industrial firms.

Empirical evidence suggests that structured ERM implementation enhances cross-functional coordination, strengthens internal controls, and improves organizational resilience to uncertainty (Monazzam & Crawford, 2024); (Fung, 2024); (Malik, 2026); and (Adinata, 2024). Nevertheless, the quality of ERM implementation is strongly influenced by strategic leadership and top management decision-making orientation.

CEO Characteristics

Chief Executive Officer (CEO) characteristics constitute a critical determinant of a firm's strategic direction. As the highest decision-maker, the CEO plays a central role in shaping investment policies, expansion strategies, governance practices, and risk management systems. Commonly examined CEO attributes in the literature include age, tenure, educational background, and professional experience (Aldoseri, 2025; Atayah et al. 2022; Mishra, 2024).

Prior research indicates that demographic and professional characteristics influence CEOs' risk preferences and strategic orientation. Younger CEOs tend to be more innovative and exhibit greater risk tolerance, whereas older CEOs are generally more conservative when confronting uncertainty (Cid-Aranda & López-Iturriaga, 2023). Longer tenure may enhance organizational knowledge and environmental familiarity but may also lead to rigidity in decision-making (Glowka et al., 2020). Educational background and professional experience further affect analytical capacity and sensitivity to sustainability and governance issues.

In the Indonesian agro-industrial sector, strategic decisions such as land expansion, investment in environmentally friendly technologies, and partnerships with smallholder farmers are strongly influenced by CEOs' risk orientation and preferences. Given the high exposure to environmental and social risks, CEO characteristics become a crucial factor in determining the quality and effectiveness of corporate risk management practices.

ESG Disclosure

Environmental, Social, and Governance (ESG) disclosure represents corporate transparency in communicating sustainability performance to stakeholders. Ioannou & Serafeim (2023) argue that ESG reflects how firms manage environmental impacts, social relationships, and internal governance structures that support accountability. Nguyen & Nguyen (2026) demonstrate that the integration of ESG factors into business practices is generally positively associated with long-term stability and corporate performance.

In the context of Indonesian agro-industry, ESG holds significant relevance due to frequent associations with deforestation, peatland degradation, carbon emissions, and social conflicts with local communities. Pressure from global markets, international certification bodies, and institutional investors encourages firms to enhance sustainability practices and transparency. Pinheiro et al., (2024) as well as Lukács & Molnár (2025) emphasize that ESG effectiveness depends on institutional quality and regulatory environments. Consequently, in developing economies such as Indonesia, ESG practices may vary substantially across firms depending on managerial commitment and stakeholder pressure. ESG disclosure serves not only as a legitimacy mechanism but also as a governance instrument that strengthens managerial accountability in managing material environmental and social risks critical to business continuity.

Upper Echelons Theory

Upper Echelons Theory, introduced by Hambrick & Mason (1984), posits that organizational outcomes are reflections of top management characteristics. The theory assumes that individuals possess bounded rationality and interpret their environment based on personal experiences, values, and backgrounds. Yuan & Teoh (2024) further argues that observable

attributes—such as age, tenure, and educational background—serve as proxies for understanding CEOs' strategic orientation and risk preferences.

In the agro-industrial sector, where firms face high uncertainty due to environmental and regulatory factors, CEO decisions regarding the integration of risk management and sustainability practices are strongly shaped by individual characteristics. Thus, Upper Echelons Theory provides the primary conceptual foundation for explaining variations in ERM implementation across firms.

Agency Theory

Agency Theory, developed by Jensen & Meckling (1976), explains the potential conflict of interest between managers (agents) and shareholders (principals). Managers may possess risk preferences that differ from those of shareholders, thereby necessitating governance mechanisms to mitigate opportunistic behavior.

Within the agro-industrial context, short-term oriented decisions—such as aggressive land expansion without environmental consideration—may elevate long-term corporate risk. Therefore, transparency and governance systems are essential to ensure that risk management is conducted accountably and aligned with stakeholder interests.

Stakeholder Theory

Stakeholder Theory, introduced by Freeman (1984), asserts that firms must consider the interests of multiple stakeholders in strategic decision-making. In the agro-industrial sector, stakeholders include smallholder farmers, local communities, regulators, global consumers, and investors. Pressure from these stakeholders encourages firms to enhance sustainability practices and transparency.

ESG disclosure functions as a key mechanism for building legitimacy and stakeholder trust. As expectations regarding environmental and social responsibility increase, agro-industrial firms are required to integrate sustainability into their risk management strategies. Accordingly, Stakeholder Theory provides the conceptual basis for understanding the importance of ESG in framing governance practices and corporate risk management.

Hypothesis Development

The Effect of CEO Characteristics on Enterprise Risk Management (ERM)

Upper Echelons Theory, proposed by Hambrick & Mason (1984), posits that corporate strategic decisions reflect the demographic characteristics and experiences of top management. Attributes such as age, educational background, professional experience, and tenure shape executives' risk preferences, cognitive capabilities, and decision-making orientation. In the context of risk policy, these attributes may influence managerial prudence, internal control systems, and the overall structure of corporate risk management to meet the stakeholders' needs and interest as explained in Stakeholder Theory by Freeman (1984).

Empirical evidence demonstrates a close association between CEO characteristics and corporate risk policies. Aldoseri (2025) states that the executive characteristics affect firms' risk-taking behavior as Beasley et al. (2023) define CEO as key risk indicators in strengthening the ERM. Trabert (2023) documents younger CEOs increase firm risk. Furthermore, Monazzam & Crawford, (2024); Fung (2024); Malik (2026); and Adinata (2024) report that internal governance mechanisms and managerial characteristics significantly affect the extent of Enterprise Risk Management (ERM) implementation.

Within the agro-industrial sector, the role of CEO characteristics becomes increasingly critical due to the industry's exposure to multidimensional risks, including commodity price volatility, climate-related risks, and environmental regulatory pressures. Effective ERM

implementation requires strategic leadership capable of integrating risk management into corporate decision-making processes. Accordingly, based on theoretical reasoning and empirical evidence, the following hypothesis is proposed:

H1: CEO characteristics positively influence Enterprise Risk Management (ERM) implementation in agro-industrial firms.

The Moderating Role of ESG Disclosure in the Relationship between CEO Characteristics and ERM

Beyond internal leadership factors, external governance mechanisms also influence risk management implementation. Agency Theory (Jensen & Meckling, 1976) suggests that strong monitoring and governance mechanisms constrain managerial discretion and mitigate opportunistic behavior. Furthermore, Stakeholder Theory (Freeman, 1984) explains that Environmental, Social, and Governance (ESG) disclosure represents one such governance mechanism that enhances corporate transparency and accountability toward stakeholders. ESG function is a means for risk mitigation mechanism for top managerial decision (Kuzmina et al., 2023).

Ioannou & Serafeim (2023) demonstrate that sustainability reporting improves governance quality and investor oversight. Global evidence further indicates that firms with strong ESG performance exhibit lower risk exposure and greater resilience to external shocks (Kuo et al., 2021). The presence of robust ESG mechanisms may institutionalize risk management systems, thereby reducing reliance on individual CEO characteristics. Meanwhile, Syamsi & Hanggraeni (2025) and Yuniati (2026) consider that ESG as a part of ERM in shaping and changing the managerial perspective and decision in risk management.

In the agro-industrial context, where firms face substantial global pressure related to deforestation, climate change, and supply chain sustainability, ESG disclosure may strengthen governance structures and reduce variation in ERM implementation arising from executive heterogeneity. Therefore, ESG disclosure is expected to moderate the relationship between CEO characteristics and ERM. Accordingly, based on these theoretical arguments and empirical findings, the following hypothesis is proposed:

H2: ESG disclosure moderates the relationship between CEO characteristics and Enterprise Risk Management (ERM) implementation in agro-industrial firms.

RESEARCH METHOD

Research Design and Sample Selection

This study employs a quantitative research design using secondary data obtained from annual reports, ESG/sustainability reports, and the Indonesia Stock Exchange database over the period 2020–2022. This study examines the influence of CEO charateristics on ERM and the role of ESG as moderating variable between CEO characteristics on ERM by using cross section data. Principal Component Analysis (PCA) is employed as a simultaneous analysis for four CEO characteristics that have been tested separately in prior studies, to obtain more conclusive results. The sample is selected by using a purposive sampling method based on the following criteria:

1. All agro-industrial firms listed on the Indonesia Stock Exchange that published complete annual reports during the 2020–2022 observation period.
2. Firms that disclosed Environmental, Social, and Governance (ESG) information during the 2020–2022 period.

Empirical Model

The empirical model is specified as follows:

$ERM_{it} = \alpha + \beta_1 CEO\ CHAR_{it} + \beta_2 ESG_{it} + \beta_3 (CEO\ CHAR_{it} \times ESG_{it}) + \varepsilon_{it}$

Where:

- ERM_{it}= Enterprise Risk Management score of firm i in year t
- CEO_CHAR_{it}= CEO characteristics index derived from PCA
- ESG_{it}= ESG disclosure score
- $CEO_CHAR_{it} \times ESG_{it}$= interaction term (moderating effect)
- α= constant
- $\beta_1, \beta_2, \beta_3$= regression coefficients
- ε_{it}= error term

Operational Definition of Variables

Dependent Variable: Enterprise Risk Management (ERM)

Enterprise Risk Management (ERM) refers to an integrated risk management system designed to identify, evaluate, and manage risks comprehensively at the entity level (Espinosa-Jaramillo, 2024). The measurement of ERM follows the approach of Florio & Leoni (2017), which assesses the level of ERM implementation based on six structural and procedural indicators. ERM indicators (binary variables):

1. Existence of a Risk Committee or Internal Control and Risk Committee (RC)
2. Existence of a Chief Risk Officer (CRO)
3. Frequency of risk committee reporting to the Board of Directors (RCtoBoD)
4. Frequency of risk assessment (RAfrequency)
5. Depth/level of risk assessment (RAlevel)
6. Risk assessment methodology (RAmethod: qualitative/quantitative)

The ERM score is calculated as:

$$ERM = RC + CRO + RCtoBoD + RAfrequency + RAlevel + RAmethod$$

Each indicator is assigned a value of 1 if present and 0 otherwise. The total score ranges from 0 to 6. This composite index approach has been widely adopted in empirical ERM literature (Florio & Leoni, 2017).

Independent Variable: CEO Characteristics

CEO Age (AGE)

CEO age reflects executive maturity, life experience, and risk preferences (Cid-Aranda & López-Iturriaga, 2023). CEO age is measured using the CEO's age in the previous year (t–1) to mitigate simultaneity concerns.

AGE=ln (CEO age)

A natural logarithm transformation is applied to normalize the distribution.

CEO Education (EDU_DUMMY)

Educational background influences analytical capacity and strategic decision-making orientation (Cid-Aranda & López-Iturriaga, 2023).

Dummy variable specification:

$EDU_DUMMY = 1\ or\ 0$, if CEO holds a degree in economics/business/accounting

otherwise

This dummy specification is commonly used in governance literature to capture finance-oriented managerial background.

CEO Experience (EXP_DUMMY)

Executive experience reflects accumulated human capital that may enhance risk

management capability (Mishra, 2024).
$EXP_DUMMY = 1\ or\ 0$, if CEO previously held a top management or board position, or otherwise. The dummy approach distinguishes significant strategic experience from non-executive backgrounds.

CEO Tenure (TENURE)

CEO tenure represents executive power, organizational knowledge, and influence over corporate policy (Cid-Aranda & López-Iturriaga, 2023).
$TENURE = ln$ (CEO tenure in years)
A natural logarithm transformation is applied to normalize the distribution.

Construction of CEO Characteristics Index Using PCA

Principal Component Analysis (PCA) is employed to construct a latent composite variable representing CEO characteristics. PCA serves as a dimensionality reduction technique appropriate when variables are multidimensional and potentially correlated (Kurita, 2021). This method reduces multicollinearity and generates a more stable composite construct. Recent studies have demonstrated that PCA can be applied to heterogeneous variables, including mixed data types, to construct composite indices in the corporate context, PCA has also been used to female executive characteristics into a single measure on firm performance by Wu & Li (2017) while Gangadharan K (2026) also used PCA for gender diversity variable, whereas de Freitas Brandão (2024) used PCA to measure corporate governance dimensions.
The component selection follows these criteria:

1. Standardization of all variables (z-scores)
2. Kaiser-Meyer-Olkin (KMO) test > 0.5
3. Bartlett's Test of Sphericity ($p < 0.05$)
4. Extraction of components with eigenvalues > 1 (Kaiser, 1960)
5. Use of the first principal component (PC1) as CEO_INDEX

The CEO composite index is constructed as:

$$CEO_CHAR\ (PC1) = W_1(Z_AGE) + W_2(Z_EDU) + W_3(Z_EXP) + W_4(Z_TENURE)$$

Where:
$CEO_CHAR\ (PC1) = CEO$ characteristics index derived from the first principal component using Principal Component Analysis
$Z_AGE, Z_EDU, Z_EXP, Z_TENURE$ = standardized (Z-score) values of CEO age, education, experience, and tenure
$W_1 - W_4$= weights obtained from the PCA eigenvectors, representing the contribution of each variable

Moderating Variable: Environmental, Social, and Governance (ESG)

ESG reflects corporate performance and transparency in environmental, social, and governance dimensions relevant to investors and stakeholders (Ioannou & Serafeim, 2023). The ESG score is measured based on the extent of ESG information disclosed in annual and/or sustainability reports by using Nasdaq ESG reporting guideline in 2019 due to global range or standard of ESG disclosure. The ESG score represents an aggregate measure combining environmental, social, and governance sub-scores.
Measurement:

$ESGDI$ = Total item disclosed

RESULT AND DISCUSSION

Statistic Test Result

Table 1. Statistic Descriptive

	N	Minimum	Maximum	Mean	Std. Deviation
CEO_CHAR	**51**	**-2.164**	**2.872**	**.000**	**1.000**
ESG	**51**	**4**	**41**	**24.06**	**10.084**
CEO_CHAR x ESG	**51**	**-60.60**	**45.95**	**-2.486**	**23.4566**
Valid N (listwise)	**51**				

Souce: Data Processed (2025)

Based on the descriptive statistics, the total number of observations in this study is 51. The CEO characteristics variable (CEO_CHAR) ranges from –2.164 to 2.871, with a mean of 0 and a standard deviation of 1, indicating that the variable has been standardized through the Principal Component Analysis (PCA) procedure. The PCA results show that Bartlett's Test of Sphericity is statistically significant (p = 0.000), suggesting that the correlation matrix is not an identity matrix and that meaningful intercorrelations exist among the CEO characteristic variables. Accordingly, PCA is employed in an exploratory manner to reduce dimensional complexity and construct a composite CEO characteristics index consistent with the theoretical framework of Upper Echelons Theory.

The ESG variable has a minimum value of 4 and a maximum value of 41, with a mean of 24.06 and a standard deviation of 10.084, suggesting substantial variation in the level of ESG disclosure among agro-industrial firms. Meanwhile, the interaction term ($CEO_CHAR \times ESG$) ranges from –60.60 to 45.95, with a mean of –2.486 and a standard deviation of 23.456, indicating variability in the moderating effect of ESG disclosure on the relationship between CEO characteristics and ERM implementation.

Table 2 shows that F test results a value of 5.794 and statistically significant at 1% (p = 0.002). It indicates that the model in this study is deemed fit. Adjusted R^2 value is 0.223 which means that 22.3% of the variation in ERM is explained by the independent variables.

Table 2. Hypothesis Testing Result

	Value	Sig	
F Test	5.794	0.002	***
Adjusted R^2	0.223		
T Test			
CEO_CHAR	3.610	0.001	***
ESG	1.689	0.098	*
CEO_CHAR x ESG	-2.604	0.012	**

Independent Variabel: ERM
*** = Significant at 1%
** = Significant at 5%
* = Significant at 10%
Source: Data Processed (2025)

The hypothesis testing results are:

1) CEO characteristics positively influence Enterprise Risk Management (ERM) implementation in agro-industrial firms with $\beta = 3.610$, $p = 0.001$), this indicates a statistically strong effect at the 1% significance level.
2) ESG disclosure moderates the relationship between CEO characteristics and Enterprise Risk Management (ERM) implementation in agro-industrial firms with $\beta = -2.604$, $p = 0.012$, this indicates a statistically negative moderating effect at the 5% significance level.

DISCUSSION

CEO Characteristics and ERM Implementation

The empirical results indicate that CEO characteristics have a positive and statistically significant effect on the implementation of Enterprise Risk Management (ERM). This finding is consistent with Upper Echelons Theory by Hambrick & Mason (1984), which posits that organizations are reflections of the values, experiences, and characteristics of top management. From this perspective, demographic attributes and executive experience namely age, education, experience, and tenure which aggregated into a single varible using Principal Component Analysis (PCA), shape risk preferences and strategic orientation, including the development of corporate risk management policies.

Within the context of the Indonesian agro-industrial sector, these findings are particularly relevant. Empirical evidence from Indonesian palm oil firms which is subsector of agro-industry sector shows heterogeneity in managerial capacity to respond to risk. In such a high-risk business, CEO characteristics become a critical determinant in establishing proactive and integrated ERM systems (Amin et al., 2024; Kuzmina et al., 2023). These findings are consistent with Florio & Leoni (2017); Espinosa-Jaramillo (2024); and Yuan & Teoh (2024) who demonstrate that ERM implementation is influenced by internal governance factors and managerial characteristics. Broader international literature further supports this conclusion. Yahaya (2025) shows that managerial attributes scuh as power and over confidence influence firm risk-taking behavior, while Aldawsari et al. (2024) finds that CEO characteristics are associated with more conservative risk policies and resulting reduction of undiversified risk exposure. Beasley at al. (2023) emphasizes that ERM effectiveness depends heavily on organizational dynamics and top management leadership, so CEOs' decision on ERM can be aligned to organizational structure and the firm's risk environment. Accordingly, in the agro-industrial sector—characterized by high exposure to business risk and market volatility, the quality of CEO leadership plays a pivotal role in shaping stable and structured risk management systems.

Hence, from a managerial standpoint, boards of commissioners and nomination committees in agro-industrial firms should consider CEO characteristics. CEOs with more strategic experience and relevant educational background contribute to a broader understanding of complexity of risk framework and mitigation. Furthermore, older CEOs tend to establish more conservative risk management policies while longer tenure of CEO develop deeper organizational knowledge and align ERM with corporate objectives.

Discussion with Moderation: ESG as a Governance Mechanism

When ESG is introduced as a moderating variable, the results indicate that the positive effect of CEO characteristics on ERM weakens in firms with higher ESG disclosure levels. This finding suggests that ESG functions not only as a sustainability mechanism but also as a governance instrument that constrains managerial discretion. Theoretically, this result can be explained through the integration of Upper Echelons Theory (Hambrick & Mason, 1984) and Agency Theory (Jensen & Meckling, 1976). Agency Theory posits that stronger monitoring mechanisms reduce

managerial discretion and limit dependence on individual executive traits.

The governance role of ESG is supported by Ioannou & Serafeim (2023), who demonstrate that sustainability reporting enhances investor oversight and governance quality. Global evidence further shows that firms with stronger ESG performance exhibit lower downside risk and greater resilience during external crises (Aksenko, 2025). Furthermore, Aprillianto et al. (2025) also finds a negative relationship between corporate social performance and systematic risk of the firm. This evidence indicates that better ESG implementation and disclosure contribute to improved firm-level managerial risk policies resulting in a reduction in overall firm risk.

In the agro-industrial sector, global pressure related to deforestation, climate change, and sustainable supply chains strengthens ESG disclosure's role as an institutionalized risk-control mechanism. Therefore, Difitri & Wijayanti (2025) suggest ESG as a part of ERM in shaping and changing the managerial perspective and decision in risk management. The findings of this study show that ESG weakens the influence of CEO characteristics on ERM and suggests the presence of a governance substitution effect. These findings are consistent with Kuo at al. (2021) who demonstrate that the top managerial traits consider ESG performance and disclosure in shaping firm risk policies. CEO has significant role in firm risk decision making indeed. However, ESG disclosure is the firm transparancy and accountability means to the stakeholders related to environmental and social issues and needs as stated in Stakeholder Theory by Freeeman (1984). Furthermore, Yuniati (2026) finds that ESG risk triggers CEO in decision making based risk. The more responsible and sustanaible business resulted in CEO decision in firm operational risk reflect firm compliance on stakeholders' needs (Syamsi & Hanggraeni, 2025).

In firms with high ESG disclosure, governance systems and risk reporting structures are more formalized, reducing reliance on the personal preferences of the CEO in ERM implementation. Conversely, in firms with low ESG disclosure, CEO characteristics become the primary determinant of corporate risk policy. This finding adds nuance to the existing literature, which often treats ESG as a complementary mechanism to managerial quality. In the Indonesian agro-industrial context, ESG appears to function as a substitutive governance mechanism that reduces variation in ERM implementation attributable to executive heterogeneity.

From a managerial and strategic perspective, these results suggest that strengthening ESG practices can enhance the stability of corporate risk management systems and reduce organizational dependence on individual leadership characteristics. Consistent with Nguyen & Nguyen (2026), who emphasize the importance of strong governance in mitigating managerial opportunism, integrating ESG into corporate structures may improve the long-term consistency of risk policies. For global investors, the combination of CEO leadership quality and firm-level ESG performance may serve as a key indicator of corporate readiness in managing systemic risks, particularly in natural resource–based sectors highly exposed to environmental and regulatory pressures.

Hence, this study not only reinforces the literature on the relationship between CEO characteristics and ERM but also contributes to the international discourse by demonstrating how ESG interacts with executive leadership in shaping risk governance within the agro-industrial sector of an emerging market. These findings extend the global discussion on the integration of strategic leadership, sustainability governance, and corporate risk management.

CONCLUSIONS, LIMITATIONS, AND SUGGESTIONS

This study provides empirical evidence that CEO characteristics have a positive and statistically significant effect on the implementation of Enterprise Risk Management (ERM) in Indonesian agro-industrial firms. These findings confirm that executive leadership quality plays a crucial role in establishing effective risk management systems, particularly in sectors characterized by high exposure to commodity price volatility, climate-related risks, and environmental

regulatory pressures.

ESG disclosure is also found to have a positive association with ERM, although its direct effect is weaker than that of CEO characteristics. More importantly, ESG disclosure significantly moderates the relationship between CEO characteristics and ERM with a negative interaction effect. This result indicates that in firms with higher ESG disclosure, ERM implementation becomes more institutionalized and less dependent on the personal attributes of the CEO. Conversely, in firms with lower ESG disclosure, the quality of ERM is more strongly influenced by executive leadership characteristics.

Overall, this study highlights the interaction between executive leadership and sustainability governance mechanisms in shaping risk management systems within agro-industrial firms. The findings contribute to the literature by demonstrating how strategic leadership and ESG governance jointly influence corporate risk management in an emerging market context.

This study is subject to several limitations. First, the relatively short observation period (2020–2022) may limit the ability to capture the long-term dynamics of ERM implementation in the agro-industrial sector. The limited time horizon may also restrict the generalizability of the findings across different economic cycles. Second, ERM measurement is based on a structural index approach, which captures the presence of risk management mechanisms but may not fully reflect the substantive effectiveness of ERM implementation. Structural indicators do not necessarily indicate how deeply risk management practices are embedded in organizational decision-making processes. Third, the CEO characteristics examined in this study are primarily demographic and professional attributes. While these observable characteristics provide useful proxies for executive orientation, they may not fully capture behavioral or psychological dimensions that influence risk-related decisions.

Future studies are encouraged to extend the observation period to obtain more stable and robust results regarding ERM implementation over time. A longer time horizon would allow researchers to examine the persistence and evolution of governance and risk management practices under varying macroeconomic conditions. Additionally, subsequent research may employ alternative ERM measures, such as text-based risk disclosure analysis or market-based risk indicators, to better capture the effectiveness and strategic integration of risk management systems. Ultimately, future research could incorporate behavioral dimensions of CEO characteristics, such as overconfidence, cognitive bias, or psychological traits, to provide a more comprehensive understanding of how executive leadership shapes corporate risk management practices.

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