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EXPLAINING EARNINGS MANAGEMENT THROUGH DIGITAL LITERACY, ESG, AND MANAGEMENT DEMOGRAPHICS

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Abstract

This study examines the determinants of accrual-based earnings management by analyzing the roles of executive digital literacy, ESG performance, management gender diversity, and management age. Earnings management is proxied by discretionary accruals estimated using the Modified Jones Model, which captures managerial discretion in accounting estimates rather than real operational manipulation. Using a quantitative design, the study analyzes firms included in the LQ45 index listed on the Indonesia Stock Exchange during 2022–2024. Through purposive sampling, 84 firm-year observations were obtained from companies consistently listed in the index, publishing complete financial statements, and not reporting consecutive losses. Financial institutions were excluded due to differences in reporting structures that limit the applicability of accrual-based models. Multiple linear regression analysis, preceded by descriptive statistics and classical assumption tests, was employed to test the hypotheses. The results indicate that executive digital literacy, management gender diversity, and management age positively influence accrual-based earnings management. In contrast, ESG performance negatively affects earnings management, suggesting that stronger sustainability performance constrains opportunistic reporting behavior.

INTRODUCTION

In the competitive business era, companies are encouraged to be more proactive in creating quality products for consumers, as well as to have the ability to manage company finances well. Therefore, financial statements provide information about the company's situation at a certain time as a result of the company's actions and conditions (Nguyen, 2022; Karampinis, 2024). This can encourage management to engage in earnings management to achieve predetermined targets (Mayapada, 2020).

Earnings management has received widespread attention in the fields of accounting and finance, particularly due to its implications for the quality of financial statements and decision-making by stakeholders. This can be done in various ways, such as recognizing revenue earlier, deferring the recognition of expenses, or using more aggressive accounting estimates (Roychowdhury, 2006; Cohen et al., 2008). The main motivation for earnings management is to achieve certain profit targets that are expected by investors, creditors, or other stakeholders (Watts & Zimmerman, 1986; Burgstahler & Dichev, 1997). Earnings management also refers

to a practice by company management in compiling or manipulating financial reports for specific purposes, such as increasing company value, meeting market expectations, or affecting investor decisions. This practice can be carried out through various methods, both accrual and real (Corporate Finance Institute, 2024). In the context of the Indonesian capital market, earnings management also occur in companies included in the LQ45 index, which is a stock index consisting of 45 companies with the largest market capitalization and highest liquidity on the Indonesia Stock Exchange (Rahayu, 2024).

One of the phenomena in earnings management occurring in Indonesia, namely the PT Indofarma Tbk, shows indications of earnings management through the recognition of fictitious income and abnormal transactions. This case was revealed through the Investigative Audit Report of the Supreme Audit Agency which originated from the development of the results of the Compliance Audit on Revenue, Expenses, and Investment Activities for 2020 to the first half of 2023 at PT Indofarma Tbk, its subsidiaries, and related agencies. In 2020, Indofarma's profit attributable to the parent entity or net profit was IDR 27.58 million. This figure represents a drastic decline of 99.65% or nearly 100% from the 2019 period of IDR 7.96 billion. PT Indofarma Tbk (INAF) and its subsidiaries are currently involved in a case of deviations that caused state losses amounting to Rp371.8 billion. This case was revealed through the Investigative Audit Report of the Audit Board of the Republic of Indonesia submitted by Deputy Chairman of ABRI, Hendra Susanto, to Attorney General ST Burhanuddin on May 20, 2024 (BPK, 2024; CNBC Indonesia, 2024). In the Indofarma case, its subsidiary, PT Indofarma Global Medika (IGM), sold medical equipment to a company that did not have the ability to pay, namely PT Promosindo Medika (Promedik). This allowed the company to record revenue in its financial statements even though the cash flow did not actually occur, which could create an illusion of short-term profitability (BPK, 2024; CNBC Indonesia, 2024).

This study focuses on accrual-based earnings management, which are influenced by executive digital literacy, environmental, social, and governance (ESG) performance, management gender diversity, and management age. Accrual-based earnings management is emphasized because it represents managerial discretion in accounting estimates and judgments within the boundaries of accounting standards, making it more closely associated with executives' cognitive abilities, technological competencies, ethical orientation, and demographic characteristics than real activities manipulation. This study focuses on earnings management, which are affected by executive digital literacy, environmental, social, and governance (ESG) performance, management gender diversity, and management age, as these factors represent key dimensions of managerial capability, ethical orientation, and demographic characteristics that shape executives' decision-making processes, access to and use of financial information, risk preferences, and sensitivity to stakeholder pressures, all of which are critical determinants of the likelihood and direction of earnings management behavior. Executive digital literacy has an important impact on earnings management, especially in the context of accounting technology utilization. Digital literacy is the ability to use technology appropriately in its various forms to find, assess, and interpret information. Digital literacy not only includes a basic understanding of technology but also how technology can be applied to improve operational efficiency and company competitiveness. One concept applied in measuring executive digital literacy is through the existence of information technology certifications owned by company executives (Xiang, 2025; Brown & Green, 2019). High digital literacy can be misused to engage in earnings management, which are actions aimed at adjusting earnings to comply with management interests. With technologies such as Enterprise Resource Planning (ERP), Big Data Analytics, and AI-driven forecasting, executives have greater ability to manage revenue recognition, delay cost recording, or change accounting estimates to engage in earnings management (Devi et al. (2024).

This study aligns with research by Marjono et al. (2022), which examined how IT certification can affect accrual earnings management. However, this differs from the results of research by Zhang et al. (2021), which concluded that the adoption of digital literacy can improve the performance of small and medium-sized businesses, thereby potentially improving earnings management through increased profit margins and market reach. This study directly examines the role of executive digital literacy in shaping accrual-based earnings management decisions. In addition, this study incorporates ESG performance and management demographic characteristics as moderating governance factors, thereby providing a more comprehensive behavioral and institutional explanation of earnings management.

The other variable is Environmental, Social, and Governance (ESG). Companies with high ESG scores are often under pressure to maintain their sustainable image in the eyes of stakeholders (Grewal et al., 2020; Albuquerque et al., 2019). In some cases, companies may engage in earnings management to align their financial performance with ESG performance expectations, either by inflating earnings reports to appear aligned with sustainability goals or by concealing the actual costs incurred to improve ESG scores. This is also in line with research by (Panjaitan & Suranta, 2024), which found a positive relationship between ESG scores and earnings management, where companies with high ESG scores tend to manage earnings to minimize risk and enhance their reputation in the eyes of stakeholders. However, this differs from the results of research by Andriani & Arsjah (2022). This study examined the relationship between ESG performance and earnings management and found that ESG scores have a negative effect on earnings management.

Gender diversity management (board gender diversity) is not just a social equality issue but has become a strategic component integrated into the Environmental, Social, and Governance (ESG) framework. The variable of management gender diversity also has an important role in affecting earnings management. According to Alves, S. (2023) showed that the presence of women on the board of directors can reduce the level of earnings management, as they tend to be more conservative in financial reporting. The research also indicated that more women in strategic positions can encourage a more inclusive and ethical organizational culture, which in turn can reduce the likelihood of earnings management. Several studies have shown that the presence of women on the board of directors can reduce the incidence of earnings management, as they tend to be more conservative in financial reporting (Arun et al., 2015; Alves, 2023). However, this contrasts with the research by Hidayati et al. (2022), who found that gender diversity on the board of directors has a significant positive effect on earnings management, meaning that the presence of women on the board of directors can increase earnings management.

The management age is a significant aspect of governance and can affect a company's financial reporting behavior. Age is believed to determine both cognitive perspectives and risk tolerance, which in turn can potentially affect the tendency to engage in earnings management. Younger managers tend to have a more aggressive orientation toward achieving short-term goals, which can increase the tendency to engage in earnings management (Ali & Zhang, 2015). Conversely, older managers, with more experience, are generally more conservative in their decision-making and value the long-term stability of the company. The experience possessed by senior managers allows them to be more cautious in financial reporting, avoiding taking risks that could damage the company's reputation in the long term (Serfling, 2014). This is also in line with Nurmayanti, P. (2022), which showed that older top management tends to report lower accrual-based earnings management than younger management. However, this differs from the results of research by Wulandari (2021), which found that the age of a company has a significant effect on accrual-based earnings management. The older the company, the more influential it is on earnings management.

Even though earnings management has been extensively studied in the Indonesian context, this study offers several distinctive contributions that extend existing literature in meaningful ways. First, unlike prior Indonesian studies that predominantly focus on traditional financial determinants or accounting-based mechanisms, this study explicitly incorporates ESG (Environmental, Social, and Governance) scores as a governance-related explanatory variable for accrual-based earnings management. By focusing on firms listed in the LQ45 index, this study captures the behavior of market-leading companies that are subject to higher investor scrutiny, stricter regulatory oversight, and stronger ESG disclosure expectations, a context that has rarely been examined in prior research. Second, this study advances the literature by conceptualizing executive digital literacy not merely as technology adoption or system usage, but as a capability-based attribute proxied by executives' information technology certifications. This approach shifts the analysis from firm-level digitalization to individual-level executive competence, which remains underexplored in Indonesian earnings management research. By integrating ESG performance and executive digital literacy within a unified agency and upper echelons framework, this study provides novel insights into how governance quality and managerial characteristics jointly shape financial reporting behavior.

This study aims to examine and analyze the effect of various factors on earnings management in companies listed on the LQ45 index of the Indonesia Stock Exchange. Analyzing executives' digital literacy and technological expertise, environmental, social, and governance (ESG) performance, gender diversity in management boards, and the management age boards in relation to the tendency to implement earnings management.

LITERATURE REVIEW

Agency Theory

Agency theory explains the contractual relationship between principals (shareholders) and agents (managers), in which information asymmetry arises because managers possess superior internal information regarding the firm's operations (Jensen & Meckling, 1976). This asymmetry creates agency conflicts, particularly when managers are under pressure to demonstrate favorable financial performance to secure compensation, maintain reputational standing, and preserve managerial autonomy. Financial statements thus become a strategic communication tool through which managers may exercise discretion, including engaging in earnings management.

In this study, executive digital literacy is positioned as a critical factor influencing agency behavior in earnings management. Executives with higher digital literacy possess greater capability to access, process, and interpret complex accounting data and financial reporting systems. From an agency perspective, such capabilities may increase managers' ability to exploit accounting discretion for earnings management purposes, particularly accrual-based manipulation, due to enhanced information-processing power and technological proficiency. Conversely, higher digital literacy may also improve reporting transparency and internal controls, thereby potentially mitigating opportunistic behavior, making its effect on earnings management an empirical question.

ESG scores serve as an external governance mechanism that can reduce agency conflicts by increasing transparency, stakeholder monitoring, and accountability. Firms with strong ESG performance are subject to greater scrutiny from investors, regulators, and other stakeholders, which may constrain managers' opportunistic incentives to manipulate earnings. Within agency theory, ESG practices function as bonding and monitoring mechanisms that align managerial actions with shareholder and stakeholder interests, thereby limiting earnings management.

Gender diversity in management is also relevant in addressing agency problems. Prior agency-based arguments suggest that female executives tend to exhibit higher ethical sensitivity, risk aversion, and compliance orientation, which can strengthen internal monitoring

and reduce opportunistic behavior. The presence of gender-diverse management teams may thus weaken agency conflicts by improving oversight and reducing the likelihood of earnings management.

Finally, management age reflects experience, career horizon, and risk preferences, which are central to agency considerations. Younger managers may face stronger career concerns and performance pressures, increasing incentives to engage in earnings management to signal short-term success. In contrast, older managers, with established reputations and shorter career horizons, may prioritize long-term firm value and reputational preservation, thereby reducing opportunistic financial reporting behavior.

Upper Echelons Theory

The Upper Echelons Theory was introduced by Hambrick and Mason (1984), who stated that the personal characteristics of top management significantly affect strategic decisions and organizational performance (Hambrick & Mason, 1984). This theory is based on the assumption that managers are human beings with limited values, experiences, and perceptions, so the decisions made by them will reflect their personal interpretations of the situations faced by the company (Hambrick, 2007). According to this theory, demographic backgrounds such as age, tenure, education level, functional experience, and socioeconomic status of managers reflect the values and cognitive frameworks that guide strategic decision-making. Therefore, managers do not act neutrally or objectively but through their respective experiences and preferences.

In the context of financial statement manipulation, particularly through accrual-based earnings management (AEM), upper echelons theory suggests that such practices reflect managers' personal values, cognitive frames, and decision-making tendencies. Executives facing pressure to demonstrate short-term performance are more likely to engage in AEM by exercising discretion over accounting estimates and judgments, such as adjusting provisions, depreciation methods, or revenue recognition timing, in order to influence reported earnings.

Stakeholder Theory

Stakeholder theory refers to an approach that emphasizes the importance of considering the interests of all parties involved in an organization, not just shareholders. According to Freeman (1984), stakeholders are individuals or groups who have an interest in or are affected by the activities of a company, including employees, customers, suppliers, the community, and shareholders (Freeman, 1984; Hörisch, Freeman & Schaltegger, 2014). Companies are expected to focus not only on profitability but also on the social and environmental impact of their operations. Conflicts of interest can arise when companies focus more on the interests of shareholders than other stakeholders. In this situation, decisions made by management may not reflect the interests of all parties involved, which can lead to dissatisfaction among other stakeholders.

Earnings Management

Based on a positive perspective, accrual-based earnings management is viewed as a managerial effort to signal stable performance, satisfy shareholder expectations, and maximize firm value through the discretionary use of accounting estimates. Conversely, from a negative perspective, accrual-based earnings management represents an opportunistic behavior in which managers exploit discretion over accruals to maximize their own utility related to compensation contracts, debt covenants, and regulatory constraints (Healy & Wahlen, 1999). Such practices involve the deliberate adjustment of accounting accruals to smooth reported earnings and meet analysts' earnings forecasts without altering underlying cash flows. The exercise of managerial judgment in selecting accounting methods and estimates that influence financial statements and

contractual outcomes is central to accrual-based earnings management (Dechow, Ge, & Schrand, 2010).

Environmental, Social, and Governance (ESG)

According to the Financial Times Lexicon, ESG refers to a concept used in capital markets to assess the way a company operates and forecast its financial potential (Pennini, A., 2020). Analysts and investors often use ESG ratings to evaluate a company's financial performance. According to research by Ningwati et al. (2022), ESG guidelines assist companies in integrating their policies in a way that prioritizes environmental, social, and good governance concerns. Assegaf (2024), showed that the ESG concept is composed of three interrelated dimensions: environmental, social, and governance. The environmental aspect reflects a company's responsibility in managing its impact on natural resources and ecosystems, including energy efficiency, carbon emissions, waste management, and environmental risk mitigation. The social aspect relates to how companies manage relationships with employees, customers, communities, and other stakeholders, encompassing labor practices, human rights, product responsibility, and social contributions. Meanwhile, the governance aspect emphasizes the quality of corporate oversight and control mechanisms, such as board structure, transparency, executive compensation, shareholder rights, and compliance with regulations. Collectively, these three dimensions represent a comprehensive framework for evaluating corporate sustainability and accountability, which also serves as an important governance mechanism influencing managerial behavior and financial reporting quality. Meanwhile, governance relates to company leadership, executive remuneration, auditing, internal control, and shareholder rights (Albuquerque, R., Koskinen, Y., & Zhang, C., 2019).

Gender Diversity Management

Gender diversity management refers to the representation of men and women in managerial and decision-making positions in a company. This concept includes not only the presence of different genders in the managerial structure but also its effect on company policy and performance. Carter et al. (2003) showed that gender diversity in the board of directors can affect more inclusive and innovative strategic decisions by bringing a broader perspective to discussions and decision-making. Furthermore, diversity theory suggests that more heterogeneous groups tend to be better at solving complex problems and adapting to change (Arun, Thankom & Almahrog, Yousf & Aribi, Zakaria, 2015).

Management Age

Management age in this study refers to the top executive team (TMT), particularly key decision-makers such as the Chief Executive Officer (CEO), Chief Financial Officer (CFO), and other board-level executives who are directly involved in strategic decision-making and financial reporting processes. These executives possess substantial influence over accounting choices, disclosure policies, and earnings management due to their authority and access to internal information. Focusing on top management aligns with upper echelons theory, which posits that organizational outcomes are reflections of the characteristics and cognitive orientations of senior executives.

Management age is measured by the average chronological age of top executives, calculated based on publicly disclosed biographical information in annual reports, sustainability reports, or company websites. In firms where multiple executives are considered, management age is commonly operationalized as the mean age of the CEO and other key executives to capture collective managerial influence rather than individual effects. Pervious research suggest that older executives tend to exhibit greater risk aversion and conservatism in decision-making, while younger executives are more open to innovation and technological change (Ali & Zhang,

2015; Serfling, 2014), making management age a relevant determinant of strategic behavior and earnings management.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The Effect of Executive Digital Literacy on Earnings Management

Executive digital literacy has a significant effect on the management of complex financial information. Based on previous research on executive digital literacy has largely focused on its role in improving transparency, operational efficiency, and corporate governance, without clearly linking it to specific forms of earnings management. Previous research tends to discuss financial reporting quality in general terms and do not explicitly distinguish between real earnings management and accrual-based earnings management, leaving ambiguity regarding the mechanism through which digital literacy affects managerial discretion.

In this study, earnings management is conceptualized as accrual-based earnings management, which relies on managerial judgment in accounting estimates and financial reporting choices rather than real operational decisions. Executive digital literacy has a critical role in this context, as digitally literate executives possess superior capabilities in managing complex financial information systems, financial analytics tools, and big data technologies. From an agency theory perspective, managers' informational advantage over shareholders enables them to use digital technology either to enhance reporting efficiency or to opportunistically manipulate discretionary accruals to achieve specific objectives, thereby intensifying agency conflicts (Jensen & Meckling, 1976).

Research by Zhang et al. (2021) showed that executive digital literacy enhances financial reporting transparency and strengthens corporate governance; however, the research also acknowledges the potential misuse of technology by digitally skilled executives to manipulate financial data. Importantly, this manipulation is not explicitly linked to a particular earnings management strategy. This study advances the literature by directly associating executive digital literacy with accrual-based earnings management, where digital skills facilitate the identification of discretionary accounting areas, such as provisions, estimates, and revenue recognition timing that are susceptible to managerial intervention.

To operationalize executive digital literacy, this study adopts IT certifications held by executives as a proxy, reflecting their depth of knowledge and experience with information technology systems. Brown and Green (2019) argue that executives with greater IT certification exposure possess a more comprehensive understanding of digital infrastructure, enabling more sophisticated use of financial reporting systems. Furthermore, combined with extensive managerial experience, high digital literacy allows executives to identify weaknesses in accounting systems and apply accrual-based strategies to manage reported earnings, particularly under stakeholder pressure. Consistent with Lee and Kim (2020), this study posits that digitally literate senior executives are more inclined to engage in accrual-based earnings management due to their ability to exercise discretion within accounting standards rather than through costly real activity manipulation. Based on the above description, the hypothesis as follows:

H_1: Executive digital literacy has a positive effect on earnings management

The Effect of ESG Score on Earnings Management

ESG indicates three important dimensions that signify a company's compliance with sustainability and social accountability. Companies with high ESG scores typically have lower incentives to engage in aggressive earnings management. Using ESG scores as a method to assess sustainability performance offers a better understanding of the correlation between ESG practices and earnings management (Kim, Y. et al, 2012). Although many companies

demonstrate a commitment to sustainability, they often face pressure from shareholders to achieve short-term profit goals. Based on stakeholder theory, companies that prioritize transparency and social responsibility, as reflected in high ESG scores, tend to avoid unethical earnings management. ESG disclosure puts additional pressure on management to maintain the accuracy of financial reports, reducing incentives for earnings management and prioritizing the interests of various stakeholders (Freeman, 1984).

Companies with high ESG scores are more transparent to stakeholders about financial and non-financial information. This level of transparency not only strengthens investor confidence but also reduces the possibility of earnings management. Therefore, companies should focus on increasing their ESG scores as part of a long-term strategy to improve their reputation and financial performance (Hanif, M., & Putri, A. N., 2025).

Velte, P (2017) showed that disclosure of ESG-related information can reduce the incentive for management to engage in earnings management. When companies proactively report their sustainability performance, this creates additional pressure to ensure accuracy in financial reports. Thus, ESG disclosure serves as an effective control mechanism against earnings management. Based on the above description, the hypothesis as follows:

H_2: ESG score has a positive effect on earnings management

The Effect of Management Gender Diversity on Earnings Management

Gender diversity management, particularly at the board and top management levels, reflects inclusiveness and diversity of perspectives in corporate strategic decision-making. Based on the upper echelon theory, it shows that managerial background, including gender diversity the management structure, affects strategic decision-making. In this case, gender diversity, especially the presence of women in top management, can lead to more cautious decision-making and reduce the tendency to engage in earnings management, along with increased awareness of ethics and transparency in financial reporting (Hambrick & Mason, 1984).

Alves, S. (2023) showed that the presence of women in managerial positions has an effect on increasing corporate internal supervision and control, which ultimately has an impact on reducing earnings management. The research by Gavious et al. (2012) found that organizations with greater female participation on the board of directors tend not to engage in earnings management, as women demonstrate higher levels of ethical compliance in decision-making.

Gender diversity can also be measured as an indicator of corporate governance quality. The presence of women in management can enhance the values of prudence and transparency in financial reporting. The relationship between gender diversity and earnings management is also seen as part of a sustainable governance strategy. The higher the level of diversity in the management structure, the greater the potential for companies to avoid manipulative practices and maintain financial integrity. Investor confidence can increase when they see that companies prioritize inclusive governance. The research by Arun et al. (2015) showed that women are generally more cautious and conservative in financial reporting, so they tend not to use aggressive earnings management methods. Therefore, gender diversity can be a non-financial measure of the integrity of financial reporting. Based on the above description, the hypothesis as follows:

H_3: Gender diversity management has a negative effect on earnings management

The Effect of Management Age on Earnings Management

Management age refers to the age of individuals who occupy top positions in a company's managerial structure, such as the Chief Executive Officer (CEO), Chief Financial Officer (CFO), and other board-level executives who are directly involved in strategic decision-

making and financial reporting processes. Based on the upper echelons' theory proposed by Hambrick and Mason (1984), the demographic characteristics of top management, including age, will be reflected in the organizational decision-making process. In general, older managers tend to show a preference for stability and risk avoidance. This makes them more cautious in managing financial reports and reluctant to engage in earnings management that could damage the company's reputation. Several studies have found that older CEOs are more sensitive to the long-term implications of earnings management on the company's sustainability (Barker, V. L., & Mueller, G. C., 2002). On the contrary, younger managers are often associated with risk-taking and a tendency to adopt an aggressive approach to financial reporting.

The management age has an important role in determining the direction of a company's accounting policy. Zhang, T., & Qu, Y. (2020) showed that younger CEOs have a higher tendency to engage in earnings management in order to pursue market incentives or to strengthen their leadership position. Meanwhile, older CEOs tend to avoid manipulation due to their greater prioritization of reputation and professional legacy. In addition, age also affects leadership style preferences. Older CEOs tend to rely on past experience and conservative approaches in decision-making, while younger CEOs are more open to innovation and aggressive strategies. In this case, management age is an important indicator for understanding the extent to which managers are willing to take risks in financial report (Serfling, M. A., 2014). Based on the above description, the hypothesis as follows:

H_4: Management age has a negative effect on earnings management

Based on the described theoretical framework, it can be formulated as follows:

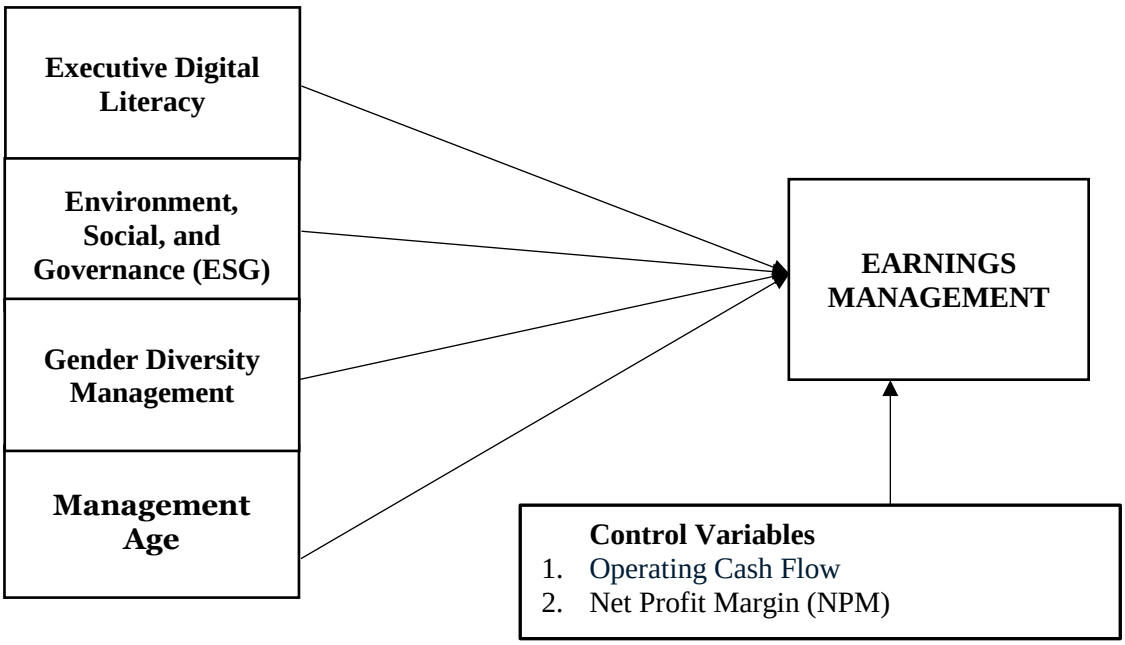


Figure 1.
Research Model

RESEARCH METHOD

This study uses quantitative research. As it is quantitative, the type of data used is secondary data from LQ45 companies listed on the Indonesia Stock Exchange (IDX) from 2022 to 2024, sourced from the website www.idx.co.id. The research sample consists of 45 companies. Purposive sampling was used to collect data that fulfilled the criteria, with a total

of 84 companies from 2022 to 2024. The sample criteria were companies that were consecutively included in the LQ 45 in 2022–2024. Second, companies that provided consecutive financial reports during the research period, namely 2022–2024. Third, companies that did not experience consecutive losses during the research period, namely 2022-2024. The analysis method used multiple linear regression. The following is the research model shown in **Table 1.**

Operationalization Variables

No	Variable	Definition	Indicator	Scale
1	Earnings Management	ERM refer to the portion of accruals that arise from managerial discretion in accounting estimates and reporting choices, which are deliberately used to influence reported earnings and potentially mislead certain stakeholders within the boundaries of accounting standards (Healy & Wahlen, 1999; Dechow et al., 2010).	$DA_{it} = \frac{TA_{it}}{A_{it-1}} - NDA_{it}$	Ratio
2	Executive Digital Literacy	Digital literacy is the ability to utilize technology to find, use, and disseminate information in the digital world (Lee, S., 2020).	Literasi Digital Eksekutif ∑ Number of Executives with IT Certification / Total Executives	Ratio
3	Environmental, Social, and Governance (ESG)	ESG refers to a comprehensive framework that evaluates a company's environmental responsibility, social engagement with stakeholders, and governance quality in overseeing management behavior, risk control, and transparency. (Pennini, A., 2020).	ESG = (WE×SE)+(WS×SS)+ (WG×SG) • W_E, W_S, W_G are the weights of each aspect (for example, environment 40%, social 30%, and governance 30%). • S_E, S_S, S_G are the scores obtained by the company for each aspect based on the indicators assessed.	Ratio
4	Gender Diversity Management	Gender diversity management, particularly at the board and top management levels, reflects inclusiveness and diversity of perspectives in corporate strategic decision-making (Gavious, I., Segev, E., & Yosef, R., 2012).	Gender Diversity Management = Number of women on the board / Total board members	Ratio
5	Management Age	Management age represents the age of individuals who hold top positions in a company's managerial structure, such as Chief	Management Age = ∑ Manager Age / Number of Managers	Ratio

No	Variable	Definition	Indicator	Scale
		Executive Officer (CEO) or managing director (Zhang, Y., & Qu, W., 2020).		

RESULTS AND DISCUSSION

Descriptive Statistical Test Results

The population in this study consists of LQ45 companies listed on the Indonesia Stock Exchange during the period 2021-2023. At the beginning of the study, there were 71 companies. Based on purposive sampling, 28 companies were selected as the research sample for the 2021 to 2023 period based on predetermined criteria. Then, using data combination methods, 84 observation data were obtained from 28 companies multiplied by 3 years. Using SPSS software, the output was obtained to describe the data, including the minimum, maximum, mean, and standard deviation values, which were then explained one by one from the variables in this study, both independent and dependent variables, so that the statistical description can be seen in the following table:

Table 2.
Descriptive Statistical Test Results

Statistic	Y	X_1	X_2	X_3	X_4	Z1_OCF	Z2_NPM
Mean	-0.039381	11.84512	31.75431	0.127679	47.85369	0.112381	20.90458
Median	-0.003498	0.000000	30.08500	0.105000	57.22000	0.090000	15.16000
Maximum	0.462066	94.74000	45.78000	0.444000	66.84000	0.502000	83.19000
Minimum	-0.230436	0.000000	17.69000	0.000000	42.00000	-0.05600	0.320000
Std. Dev.	0.086893	23.51734	7.534191	0.090754	3.515058	0.101055	17.97864
Skewness	1.595319	2.594201	0.261664	1.341816	0.500732	1.441785	1.582580
Kurtosis	14.60449	9.626536	2.282337	5.290637	2.448560	6.101471	5.125148
Jarque-Bera	505.3317	205.0200	2.761194	43.66747	4.574560	62.76035	51.31526
Probability	0.000000	0.000000	0.251428	0.000000	0.101542	0.000000	0.000000
Sum	-3.308042	994.9900	2667.530	10.72500	4019.710	9.440000	1755.985
Sum Sq. Dev.	0.666547	45904.42	4711.415	0.683612	1025.518	0.847604	26828.22
Observations	84	84	84	84	84	84	84

Source: Processed Data Eviews 12, 2025

Table 2 shows the descriptive statistics results of the study for each variable. The results of the descriptive statistical test on the ML (Profit Management) variable as the dependent variable (Y) obtained a minimum value of -0.330436, a maximum of 0.462966, with a mean of -0.039381 and a standard deviation of 0.088939. A standard deviation value greater than the mean indicates greater variation in profit management, with a wider distribution of data. The results of the descriptive statistical test for the LDE (Executive Digital Literacy) variable as the independent variable (X1) show a minimum value of 0.00 and a maximum value of 94.74, with a mean of 11.84512 and a standard deviation of 23.51734. A standard deviation value that is greater than the mean indicates that the LDE variable data has greater variation, with a wider data distribution. The results of the descriptive statistical test for the ESG (Environmental, Social, and Governance) variable as an independent variable (X2) show a minimum value of 17.56 and a maximum value of 45.78, with a mean of 31.75631 and a standard deviation of 7.534191. The results of descriptive statistical tests on the Gender Diversity Management variable as an independent variable (X3) show a minimum value of 00.00 and a maximum value of 0.444, with a mean of 0.127679 and a standard deviation of 0.105. The descriptive statistical test results for the Management Age variable as an independent variable (X4) show a minimum value of 52 and a maximum value of 66.24, with a mean of 57.85369 and a standard deviation of 3.515058. For the Operating Cash Flow (OCF) variable, the minimum value obtained was

17.86179 and the maximum was 32.49773, with an average of 27.17496 and a standard deviation of 4.76892. This data shows that there is little variation in the company's operating cash flow, with a small spread based on a standard deviation that is lower than the average. For the Net Profit Margin (NPM) variable, the minimum value recorded is -6.26518 and the maximum is 64.76622, with an average of 18.63889 and a standard deviation of 14.15811. This variable shows data that ranges around the average, which is reflected in the standard deviation value that is lower than the average value.

Panel Regression Model Selection

Chow Test

The Chow test is used to choose between the Common Effect Model (CEM) and the Fixed Effect Model (FEM). This test is used to determine the comparison of the F probability value with significance. If the probability value of F < 0.05, then Ho is rejected, and the selected model is the FEM model compared to the CEM. Conversely, if the probability value of F > 0.05, then Ho is accepted, and the selected model is the CEM model, which is better than the FEM model (Fiveable., 2025).

Table 3.
Chow Test Results

Effect Test	Probability
Cross-section F	0,0008
Cross-section Chi-square	0,0000

Source: Processed Data Eviews 12, 2025

From Table 3 above, the cross-section F probability value is 0.0008 < 0.05; thus, the appropriate panel data model between the Common Effect Model and the Fixed Effect Model is the Fixed Effect Model (FEM).

Hausman Test

The Hausman test is used to select the most appropriate model between the Fixed Effect Model (FEM) and the Random Effect Model (REM). This test is used to determine the comparison between the chi-square probability value and significance. If the chi-square probability value is < 0.05, then Ho is rejected, and the selected model is the FEM model compared to the REM model. Conversely, if the chi-square probability value is > 0.05, then Ho is accepted, and the REM model is selected compared to the FEM model (Hausman, J. A., 1978).

Table 4.
Hausman Test Results

Test Summary	Probability
Cross-section random	0.0741

Source: Processed Data Eviews 12, 2025

Based on the Hausman test shown in Table 4 above, the probability value of cross-section random is 0.0741 (greater than 0.05), so statistically Ho is accepted and Ha is rejected. Therefore, the appropriate estimation model used in panel data regression is the random effect model. From the results of the Chow Test and Hausman Test, there is no better model to use in the regression model, so we will proceed with the Lagrange Multiplier (LM) Test.

Lagrange Multiplier (LM) Test

The Lagrange Multiplier (LM) test is conducted to determine which model is most appropriate between the Common Effect Model (CEM) and the Random Effect Model (REM).

After obtaining the LM value, the LM value is compared with the chi-square value (Hausman, J. A., 1978). The hypotheses used for the Lagrange Multiplier Test are:
Ho: Common Effect Model, if the LM (Breusch-Pagan) value < 0.05
Ha: Random Effect Model, if the LM (Breusch-Pagan) value > 0.05

Table 5.
Lagrange Multiplier Test Results

Test Summary	Probability
Breusch-Pagan	0.0053

Source: Processed Data Eviews 12, 2025

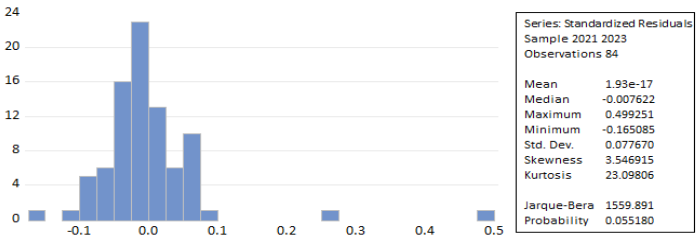
Based on Table 5 above, it can be seen that the Lagrange Multiplier (LM) test result obtained from a probability of 0.0053 shows that this number is smaller than 0.05, so Ho is rejected and Ha is accepted. Therefore, it can be concluded that the random effect model is more appropriate to use.
The regression results using the random effect model are as follows:
Table 6.
Random Effect Model Regression Results (REM)

Variable	Prediction	Coefficient	t-statistic	Sig	Information
C		-0.081109	-0.399292	0.0908	
Executive Digital Literacy (EDL)_X_1	Positive	0.000347	0.857727	0.0378	Accepted
Environmental, Social, and Governance (ESG)_X_2	Negative	-0.002199	-1.485040	0.0417	Accepted
Gender Diversity Management (GDM)X_3	Positive	0.116003	0.952089	0.0441	Accepted
Management Age (MA)_X_4	Positive	0.003516	1.079212	0.0239	Accepted
Operating Cash Flow (OCF)_K_1	Negative	-0.554070	-6.117747	0.0800	Rejected
Net Profit Margin (NPM)_K_2	Positive	0.001147	2.121538	0.1271	Rejected
R-*squared*	: 0.358969				
F- Statistic	: 4.824513				
Signifikansi (F- Statistic)	: 0.000081				

Source: Processed Data Eviews 12, 2025

Classical Assumption Test
Normality Test

Determining whether data is normally distributed or not can be done using the Jarque-Bera Test (JB) statistical test. The Jarque-Bera Test is a statistical test used to determine whether data is normally distributed (Hausman, J. A., 1978). If the probability value is greater than 5%, then the data is said to be normally distributed. The results of the normality test can be seen in the following figure:



Source: Processed Data Eviews 12, 2025
Figure 2.
Normality Test Results

Based on Figure 2, the Jarque-Bera probability value is 0.055180, which is greater than α (0.055180 > 0.05). This result indicates that the data is normally distributed or has passed the normality test.

Multicollinearity Test Results

The multicollinearity test aims to determine whether there is a correlation between the independent variables in this regression. One way to determine multicollinearity is by using the Variance Inflation Factor (VIF) and tolerance. The decision criteria for tolerance and VIF values are that if the tolerance is ≥ 0.10 or the VIF value is ≤ 10, then there is no multicollinearity (Hausman, J. A., 1978).

Table 7.
Multicollinearity Test Results

	VIF
EDL_X_1	1.465788
ESG _X_2	1.355678
GDM _X_3	1.578675
MA_X_4	1.168676
OCF_K_1	1.434567
NPM_K_2	1.698436

Source: Processed Data Eviews 12, 2025

Based on Table 7, it can be seen that the VIF value for each variable is less than 10. It can be concluded that the data in this study does not have a multicollinearity problem.

Autocorrelation Test Results

The Durbin-Watson (DW) test was used to determine whether there were autocorrelation problems in the regression model. The results of the Durbin-Watson test in this study can be explained as follows:

Table 8.
Autocorrelation Test Results

Test Summary	Value
Durbin-Watson stat	1.123643

Source: Processed Data Eviews 12, 2025

Based on Table 8 above, the Durbin-Watson Stat (DW) value is 1.123643. Thus, it can be seen that the result obtained is -2 < 1.123643 < +2, so it can be concluded that there is no autocorrelation in the research model.

Heteroscedasticity Test Results

This test was conducted by comparing the significance values of each independent variable. If the significance value is greater than 0.05, then it can be said that there is no heteroscedasticity (Hausman, J. A., 1978). The following are the results of the heteroscedasticity test:

Table 9.
Heteroscedasticity Test Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
C	0.035845	0.0674768	0.514589	0.7243
EDL_X1	0.025941	0.017867	1.4837989	0.1564
ESG _X2	-0.033567	0.020366	-0.292589	0.3272
GDM_X3	0.000576	0.001699	0.085679	0.5883
MA _X4	0.065344	0.069357	0.647905	0.7348
OCF_K1	-0.000567	0.000167	-0.553680	0.6778
NPM_K2	-0.000342	0.000890	-0.296879	0.1343

Source: Processed Data Eviews 12, 2025

Based on the results in Table 9 above, it can be seen that the probability value of each variable is greater than 0.05 (5%). Thus, it can be concluded that the data in this study does not contain heteroscedasticity.

Statistical Hypothesis Testing Results

Determination Coefficient (R^2) Test Results

The determination coefficient (R^2) is used to explain the proportion of variation in the dependent variable that is explained by the variation in the independent variable. The following are the results of the determination coefficient test:

Table 10.
Determination Coefficient (R^2) Test Results

Test Summary	Value
Adjusted R-Squared	0.358969

Source: Processed Data Eviews 12, 2025

Based on Table 10 above, it can be seen that the adjusted R-squared value is 0.358969, or 35.89%. This indicates that the independent variables, which include executive digital literacy, Environmental, Social, and Governance (ESG), gender diversity management, and management age, are able to explain the dependent variable (earnings management) by 35.89%, while the remaining 64.11% is influenced by other variables not included in the research model.

T-Test Results

The t-test is used to determine the magnitude of the effect of independent variables individually on the dependent variable. Based on the significance value, there is a criterion that if the significance value is > 0.05, the hypothesis is rejected, which means that the independent variable does not affect the dependent variable, while if the significance value is < 0.05, the hypothesis is accepted, which means that the independent variable affects the dependent variable. The t-test results can be seen in the following table:

Table 11.
T-Test Results

Variable	t- Statistic	Sig
Executive Digital Literacy (EDL)_X_1	0.857727	0.0378
Environmental, Social, and Governance (ESG)_X_2	-1.485040	0.0417
Gender Diversity Management (GDM)_X_3	0.952089	0.0441
Management Age (MA)_X_4	1.079212	0.0239
Operating Cash Flow (OCF)_K_1	-6.117747	0.0800
Net Profit Margin (NPM)_K_2	2.121538	0.1271

Source: Processed Data Eviews 12, 2025

Based on the statistical test results in Table 11 above, the hypothesis can be interpreted as follows:

1. The first hypothesis (H_1) is that executive digital literacy has a significant effect on earnings management. Based on the test results, the t-statistic value is 0.857727 with a probability (significance) value of 0.0378 (< 0.05), so it can be concluded that the executive digital literacy variable has a significant effect on earnings management.
2. The second hypothesis (H_2) is that environmental, social, and governance (ESG) significantly affects earnings management. Based on the test results, a t-statistic value of -1.485040 was obtained with a probability value (significance) of 0.0417 (< 0.05). Therefore, it can be concluded that the environmental, social, and governance (ESG) variable has a significant effect on earnings management.

3. The third hypothesis (H_3) is that gender diversity management has a significant effect on earnings management. Based on the test results, a t-statistic value of 0.952089 with a probability value (significance) of 0.0441 (< 0.05) was obtained, so it can be concluded that the gender diversity management variable has a significant effect on earnings management.
4. The fourth hypothesis (H_4) is that management age has a significant effect on earnings management. Based on the test results, a t-statistic value of 1.079212 was obtained with a probability value (significance) of 0.0239 (< 0.05), so it can be concluded that the management age variable has a significant effect on earnings management.

Simultaneous Test Results (F Statistical Test)

This test aims to determine whether all independent variables, or free variables, included in the regression have a significant effect on the dependent variable at the same time. If the F-count is greater than the F-table, then all independent variables have a combined effect on the dependent variable. Meanwhile, the test with a probability value is that if the probability value is < 0.05, then the model is accepted. The following is the F-test table:

Table 11.
F-Statistic Test Results

Test Summary	Value
F- Statistic	6.079847
Prob (F- Statistic)	0.000012

Source: Processed Data Eviews 12, 2025

Based on Table 11 above, it can be seen that the F-count is 6.079847 with a probability (F-statistic) of 0.000012. The probability value is 0.000012 < 0.05, which means that the variables of executive digital literacy, Environmental, Social, and Governance (ESG), management gender diversity, and management age collectively affect earnings management.

Discussion

The Effect of Executive Digital Literacy on Earnings management

The results of the study indicate that executive digital literacy has a positive effect on earnings management. This shows that every increase in executive digital literacy enables company executives to utilize advanced technologies such as Enterprise Resource Planning (ERP), Big Data Analytics, and AI-driven forecasting in managing and manipulating financial reports. Based on agency theory, it explains how managers, who have more information than shareholders, can utilize digital technology in financial information management, either to maximize financial reporting or to manipulate data to achieve certain goals (Ronen, J., & Yaari, V., 2008). This can occur when executives use their digital skills to manage profits through the use of advanced technologies that can exacerbate conflicts of interest between shareholders and managers. Devis et al. (2024) states that the use of digital technology can be used to manage revenue recognition, delay costs, or modify accounting estimates to achieve desired profit targets. Although digital literacy can improve the efficiency and transparency of financial reporting, this technology also provides opportunities for misuse in data manipulation to achieve certain goals, such as fulfilling market expectations or profit targets (Xiang, 2025).

Brown & Green (2019) emphasizes that executives with IT certifications are more likely to have a deep understanding of the company's digital infrastructure, which makes it easier for them to identify potential financial statement manipulation. This is in line with the research by Marjono et al. (2022), which showed that information technology certifications can affect executive involvement in earnings management. Although digital literacy can improve efficiency and transparency in financial reporting, this study shows that more advanced digital

technology can be misused for earnings management. However, this differs from the research by Zhang, L., Yang, Y., & Wang, H. (2021), which concluded that the adoption of digital literacy can improve the performance of small and medium-sized businesses, thereby potentially improving earnings management through increased profit margins and market reach.

The Effect of Environmental, Social, and Governance (ESG) on Earnings management

ESG scores have a negative effect on earnings management, indicating that companies committed to sustainability and transparency are less likely to engage in earnings management. Based on stakeholder theory, companies that prioritize transparency and social responsibility, as reflected in high ESG scores, tend to avoid unethical earnings management. ESG disclosure provides additional pressure on management to maintain the accuracy of financial reports, reducing incentives for earnings management and prioritizing the interests of various stakeholders (Freeman, 1984). Companies' ESG scores are determined based on aggregated assessments of their environmental, social, and governance performance, typically compiled by independent ESG rating agencies using publicly disclosed information such as sustainability reports, annual reports, and regulatory filings. These scores reflect how well firms manage environmental impacts, stakeholder relationships, and governance structures, with higher scores indicating stronger sustainability commitment and oversight quality. Firms with high ESG scores tend to safeguard their reputation and stakeholder trust, which increases reputational and monitoring costs associated with opportunistic behavior; consequently, they are less likely to engage in earnings management practices that could harm the public image and credibility (Grewal et al., 2020). Companies with high ESG scores usually strive to maintain their reputation and the trust of stakeholders, including investors, regulators, and the public. Therefore, companies with high ESG scores are more likely to avoid financial statement manipulation that could damage their image in the eyes of the public and stakeholders (Grewal et al., 2020).

Velte (2017) showed that companies that actively report their sustainability performance tend to reduce the incentive to engage in earnings management. This is also supported by the research by Grewal et al. (2020), which revealed that companies with high ESG scores are more likely to maintain accountability and transparency, which naturally reduces earnings management. The results of this study indicate that transparent ESG information disclosure can serve as an effective control mechanism against earnings management. With greater transparency in ESG reports, companies are expected to reduce earnings management, as such actions can damage the credibility and integrity of their reports. However, this differs from the results of research by Andriani, N., & Arsjah, R. J. (2022). This study examined the relationship between ESG performance and earnings management and found that ESG scores have a negative effect on earnings management.

The Effect of Gender Diversity Management on Earnings management

Gender diversity management has a positive effect on earnings management. These results indicate that companies with greater gender diversity may be more likely to engage in earnings management, which may be done to fulfill higher earnings expectations from stakeholders, especially in highly competitive capital markets. Based on the Upper Echelons theory, it shows that managerial background, including gender diversity in the management structure, affects strategic decision-making. In this case, gender diversity, especially the presence of women in top management, can lead to more cautious decision-making and reduce the tendency to engage in earnings management, along with increased awareness of ethics and transparency in financial reporting (Hambrick & Mason, 1984). Gender diversity in management refers to the representation of women in strategic positions and corporate decision-making. The results of research by Hidayati et al. (2022) showed that gender diversity can

actually increase earnings management. This may be because women on the board of directors may be more likely to follow more conservative social norms in financial decision-making, but they may also seek to improve the company's short-term performance to fulfill expectations.

The increase in gender diversity management in this study be affected by several factors, such as pressure to demonstrate better performance to stakeholders or demands to fulfill market expectations that are often unrealistic. This is in line with research by Nurul Hidayati et al. (2022), who found that gender diversity on the board of directors has a significant positive effect on earnings management, meaning that the presence of women on the board of directors can increase earnings management. However, this differs from the results of research by Ramadan, G. R. (2021), which stated that there is no difference in the level of earnings management between companies that have and do not have gender diversity on their boards. This indicates that in certain situations, gender diversity does not affect earnings management.

The Effect of Managerial Age on Earnings management

Management age has a positive effect on earnings management. Based on the Upper Echelons theory (Hambrick & Mason, 1984), the demographic characteristics of management, including age, will affect a company's strategic decisions. Management age refers to the age of individuals who hold executive or managerial positions in a company. Based on Upper Echelons Theory, manager age is related to leadership style and decision-making preferences. Older managers tend to be more conservative and cautious in managing financial reports, so they are more likely to avoid earnings manipulation practices that could damage the company's reputation. Conversely, younger managers may be more willing to take risks and more open to aggressive strategies in earnings management, which can increase earnings management (Hambrick & Mason, 1984).

These results are in line with research by Zhang & Qu (2020), which showed that younger CEOs are more likely to engage in earnings management because they are more oriented toward short-term achievements and improving market performance. Conversely, older CEOs tend to be more cautious in their decision-making, more conservative, and more focused on the long-term sustainability of the company (Barker & Mueller, 2002). These results indicate that younger managers tend to be more inclined to engage in earnings management, especially to meet short-term targets or improve market performance. However, this differs from the results of a study by Wulandari (2021), which found that the age of a company has a significant effect on accrual earnings management. The older the company, the more influential it is on earnings management.

CONCLUSION

This study aims to examine and analyze the effect of executives' digital literacy and technological expertise, ESG performance, gender diversity on boards, and senior management age on earnings management practices in companies listed on the LQ45 index of the Indonesia Stock Exchange, and the findings confirm that these governance and managerial characteristics significantly shape financial reporting behavior. Executive digital literacy strengthens earnings management by utilizing advanced technologies such as ERP, data analytics, and AI for the more complex financial statement manipulation. Although digital literacy is expected to increase transparency, in fact it creates opportunities to conceal manipulation through more sophisticated techniques. The technology used is a double-edged sword, where data manipulation can be hidden through sophisticated techniques such as real-time reporting or seemingly legitimate but manipulated transaction schemes. High ESG scores suppress earnings management by creating strict oversight mechanisms, where multi-stakeholder involvement and strengthened reporting standards mitigate opportunities for manipulation. Although pressure from investors and the public reinforces caution in financial reporting, companies with

high ESG scores sometimes use real activities manipulation to align financial performance with sustainability targets. This shows that even though ESG reinforces transparency, earnings management can take more subtle forms through the management of operational activities.

Gender diversity variables in management, particularly women in strategic positions, can reinforce earnings management due to pressure to prove company performance in difficult situations, such as the glass cliff phenomenon. Women who are minorities on boards of directors also tend to be more aggressive in managing financial reporting, which can potentially increase earnings manipulation. These results contradict the theory of gender conservatism, which expects women to reduce earnings manipulation, suggesting that institutional and cultural dynamics are more dominant than gender characteristics in corporate governance in Indonesia. Furthermore, the variable of senior management age can reinforce earnings management because senior managers approaching retirement are often driven to demonstrate good performance as their final legacy. Their experience with accounting standards allows for more sophisticated manipulation, such as adjustments to accounting estimates that are difficult to detect. Although the "Upper Echelons Theory" theory predicts that older managers are more cautious, in reality, their consolidated positions and high self-confidence actually encourage them to be more daring in manipulating financial statements.

Despite these contributions, this study has several explicit limitations. First, the sample is restricted to LQ45 firms, which limits the generalizability of the findings to other sectors and smaller firms. Second, the measurement of digital literacy relies on observable proxies rather than direct competency assessments, potentially constraining construct validity. Third, the relatively short observation period may not fully capture long-term strategic earnings management behavior across different economic cycles. Fourth, the exclusive reliance on secondary quantitative data limits the ability to explore deeper psychological, cultural, and organizational dynamics underlying managerial decisions. Additionally, the study does not differentiate between accrual-based and real earnings management in a more granular manner, which may obscure nuanced managerial strategies. Finally, potential endogeneity issues and unobserved heterogeneity cannot be entirely ruled out, despite the statistical controls applied, which may affect the robustness of causal interpretations.

For further research, it is recommended to expand the scope of variables by adding more comprehensive digital literacy indicators such as experience in implementing AI and blockchain technology, as well as considering moderating variables such as performance pressure and organizational culture. The research period also needs to be extended to 5-10 years to observe sustainable trends, with the sample expanded to various sectors outside the LQ45 to improve the generalization of the results. Qualitative research through in-depth interviews with boards of directors is also needed to understand the mechanisms behind the positive relationship between gender diversity and earnings management in the context of Indonesian corporate culture.

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