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Abstract

This study examines the impact of Audit Fees and Digital Transformation on Sustainability Performance with Managerial Ownership as Moderation. The populace in this research were energy businesses that are listed on the Indonesia Stock Exchange (IDX) in 2020-2023, totaling 90 companies. The sampling design Purposive sampling was employed so that the an example used was 34 businesses. The method of analysis used was panel data using the eviews 13 for linear regression analysis tool. The outcomes of the study simultaneously showed that Audit Fees and Digital Transformation had an effect on Sustainability Performance. Partially, it showed that audit fees had an positive effect on sustainability performance, but digital transformation had no effect on sustainability performance. The moderating variable, namely managerial ownership, could moderate audit fees on sustainability performance, but could not moderate digital transformation on sustainability performance.

Introduction

Sustainability has become a concern for all UN member nations, including Indonesia, which adopted the Sustainable Development Goals in 2015 to ensure prosperity by 2030 (Aziz & Najicha, 2024). Investors, regulators, and other stakeholders will increasingly develop sustainability reporting practices. Interest in greater transparency and accountability in corporate reporting of corporate strategies can support trust and help markets function more efficiently, driving organisational progress, sustainability, and economic growth.

According to the United Nations in The Sustainable Development Goals Report 2024, climate change remains one of the most pressing global challenges today. Carbon dioxide (CO₂) emissions generated by human activities particularly from the combustion of fossil fuels such as coal, oil, and natural gas are a major driver of the rise in the Earth's average temperature (United Nations, 2024). In 2023, global CO₂ emissions from fossil fuel combustion and industrial processes increased by 1.1%, reaching an unprecedented level of 37.4 gigatons (Friedlingstein et al., 2023).

In Indonesia, many sectors contribute to carbon dioxide emissions from total GHG emissions through the development of energy companies, including the transportation, household, service, agricultural, industrial, and electricity sectors. Data published by Climate Transparency indicate that the carbon intensity of Indonesia's energy sector has increased over the past five years, rising by 13.6%, while the G20 average has declined (Climate Transparency, 2020). In 2020, Indonesia's carbon intensity exceeded 60 tCO₂, which was higher than the G20 average (Climate

Transparency, 2020). This trend is closely associated with Indonesia's high reliance on fossil fuels, which accounted for approximately 75% of the national energy mix (Climate Transparency, 2020).

The high emission contribution from the energy sector is inextricably linked to the coal industry's role as a key component in the combustion of fossil fuels. One of Indonesia's largest coal companies, PT Indo Tambangraya Megah Tbk (ITM), reported total GHG emissions of 34,289,495 tons of O₂e in 2023 (ITM Sustainability Report, 2023). Of this total, approximately 94% came from indirect emissions (Scope 3), primarily resulting from the use of coal by third parties outside the company's direct operations (ITM Sustainability Report, 2023). The high contribution of emissions from the energy sector highlights the importance of sustainability reporting to maintain company performance, particularly in high risk sectors (Fitriani, 2025). Sustainability reports demonstrate a company's commitment to managing environmental and social impacts by providing transparency to stakeholders and strengthening investor confidence (Hongming et al., 2020).

This study highlights the termination factor from the Audit Fee side, which is moderated by Digital Transformation. The audit fees in accounting and auditing shows the expenses incurred with external audit services' corporation. This issue is a key corporate financial transparency and governance indicator. Recent study stated that audit fees influencing corporate performance and various managerial aspects (Yen et al., 2018). The audit fees and sustainability performance relation is inadequately examined, especially in regard to digital transformation.

The transformation business models and operations into digitalization in globalization and the Fourth Industrial Revolution (Industry 4.0). The cutting-edge technologies implementation such as automation, artificial intelligence (AI), big data, and the Internet of Things (IoT) as the digital transformation core which create operation in organizations efficient, responsively, and sustainably (Anam et al., 2025). The digital technologies incorporation into business strategies, companies can improve operational effectiveness, reduce costs, and optimize stakeholder value (Muaffa & Rohman, 2025).

Managerial ownership is the company shares quantity from managers which affect strategic decision-making and corporate outcomes. The extent to which audit fees and digital innovation contribute to sustainability performance related to managerial ownership that influencing strategic decisions such as sustainability priorities and investments in digital technology (Li, 2022).

Additionally, this study examines whether audit fees and digital transformation contribute to improved sustainability performance by promoting efficiency and transparency in sustainability reporting. Prior research has documented that ESG disclosure and sustainability related performance are associated with higher audit effort and audit fees, reflecting greater assurance demand and reporting complexity (Wang et al., 2025). In parallel, recent studies highlight that digital transformation can enhance the quality, timeliness, and transparency of sustainability reporting by enabling better data integration and monitoring mechanisms (Molho et al., 2025). However, empirical research that integrates audit fees and digital transformation into a single model, while considering managerial ownership as a moderating variable, remains limited in Indonesia particularly in the energy sector, which is a major contributor to national emissions thereby indicating a significant research gap.

The novelty of study is integrating aspects of corporate governance (audit fees) and technological innovation (digital transformation) to explain sustainability performance by managers serving in a moderate variable reflecting the strategic management role to direct sustainability orientation. Furthermore, the study provides contextual contributions on Indonesia's energy sector as the industry who have dominant role in national carbon emissions and methodological contributions through content analysis based on GRI Standards and digitalization-related keywords.

Literature Review

Legitimacy Theory

Legitimacy theory clarifies that companies gain community and environmental approval for their actions through alignment with societal norms and expectations. It develops public acceptance (Oktariyani, 2024). stated that it is a mental state that supports individuals or groups who are sensitive to the environment (Choiriah & Angin, 2025). It is related to a company's obligation to publish sustainability reports as a manifestation of its social and environmental responsibility. Furthermore, the company gains legitimacy by demonstrating its commitment to sustainability initiatives and by disclosing relevant information transparently. The theory supporting sustainability performance is that it reflects the company's maintenance of legitimacy with stakeholders.

Triple Bottom Line Theory

The Triple Bottom Line (TBL) theory, as outlined by Jeurissen (2000), provides a crucial theoretical foundation for assessing sustainability performance. The TBL framework emphasises that corporate success is not measured by social and environmental outcomes related to economic success impact (Ahmad & Wong, 2019). It defines sustainability across three core dimensions: economic (profit), social (people), and environmental (planet). It encourages firms to balance financial growth with social welfare and ecological preservation, aligning business objectives with long-term sustainable value creation. It is relevant to audit fees and to digital transformation, which led the company to achieve economic, social, and environmental balance. Furthermore, TBL is a conceptual foundation that links governance and technological aspects to sustainability outcomes.

The Effect of Audit Fees on Sustainability Performance

Audit fees reflect the amount of resources allocated by firms to the audit process. Companies that pay higher audit fees tend to receive more comprehensive and in-depth audit services (Dakhli, 2022). Auditors with adequate resources are able to conduct more thorough examinations of both financial and non-financial aspects, including sustainability practices. This condition encourages management to implement sustainability commitments more seriously, as corporate actions are subject to more extensive verification. Firms that allocate higher audit budgets also signal a stronger commitment to maintaining transparency toward stakeholders (Nicolò et al., 2021). This relationship can be explained by legitimacy theory, which suggests that firms seek to obtain societal approval by aligning their activities with prevailing social norms (Sun et al., 2022). This argument is consistent with the findings of Song et al. (2023) and Zhang et al. (2023), which indicate that ESG performance is associated with audit fees and that ESG disclosure influences audit pricing.

H₁: There is a positive relationship between audit fees and sustainability performance.

Influence of Digital Transformation on Corporate Sustainability Performance

Digital transformation refers to the integration of digital technologies into all aspects of business, fundamentally changing how firms operate and deliver value to stakeholders. Companies that adopt digital transformation can enhance operational efficiency, information transparency, and green innovation, thereby promoting better sustainability performance (Li, 2022). Digital technologies such as big data, artificial intelligence, and the internet of things enable firms to monitor carbon emissions, optimize resource utilization, and significantly reduce environmental impacts (Y. Liu et al., 2024). This relationship can be explained through legitimacy theory, which posits that firms seek to obtain societal approval by aligning their activities with prevailing norms and social expectations. This argument is consistent with the findings of Jiang (2025) and Chen et al. (2023), who show that digital transformation helps firms improve environmental information disclosure

as an effective means of gaining legitimacy and demonstrate that digital transformation positively affects ESG performance in Chinese manufacturing firms by enhancing corporate transparency.

H₂: Examining the Role of Managerial Ownership in Moderating the Audit Fee–Sustainability Performance Nexus

The Influence of Managerial Ownership as a Moderating Variable on the Audit Fee Sustainability Performance Relationship

Audit fees reflect the level of resources allocated to the audit process. Firms that pay higher audit fees tend to receive more comprehensive audit services, which encourage management to implement sustainability practices in a more transparent and accountable manner (Song et al., 2023). Managerial ownership plays a crucial role in this relationship. When managers hold company shares, their interests are aligned with those of shareholders, motivating them to manage the firm more effectively, including in sustainability-related aspects (Wu et al., 2022). Managerial ownership strengthens the effect of audit fees because managers who are also shareholders are more likely to support rigorous audit monitoring in order to protect corporate reputation and long-term firm value (Zahid et al., 2023). This relationship can be explained by legitimacy theory, which suggests that firms seek to obtain societal approval by aligning their activities with prevailing social norms (Al Amosh & Khatib, 2022). This argument is consistent with the findings of Dakhli (2022) and Zahid et al. (2023), which indicate that managerial ownership reinforces the relationship because manager-shareholders are more concerned with maintaining corporate legitimacy through optimal sustainability performance.

H₃: Managerial ownership serves as a reinforcing factor in the link between audit fees and sustainability performance

The Influence of Managerial Ownership as a Moderating Variable on the Digital Transformation Sustainability Performance Relationship

Digital transformation refers to the adoption of digital technologies that change how firms operate and create value. Companies that implement digital transformation are able to improve operational efficiency, optimize resource utilization, and reduce environmental impacts, thereby promoting better sustainability performance (Li, 2022). Corporate digitalization significantly enhances ESG performance through reductions in agency costs and improvements in corporate goodwill (Fang et al., 2023). Digital technologies enable firms to monitor carbon emissions in real time and manage supply chains in a more sustainable manner (Z. Liu et al., 2024). Managerial ownership plays an important moderating role in this relationship. When managers hold company shares, their interests are aligned with the firm's long-term objectives, making them more committed to supporting digital technology investments for sustainability. This relationship can be explained by legitimacy theory, which posits that firms seek societal approval by aligning their activities with prevailing social norms. Consistent with the findings of Zheng and Bu (2024), Al Amosh and Khatib (2022), and Peng et al. (2023), managerial ownership strengthens the effect of digital transformation because manager-shareholders are more motivated to protect corporate reputation through transparent sustainability practices, confirming that digital transformation positively affects firms' ESG performance.

H₄: Higher levels of managerial ownership enhance the effect of digital transformation on sustainability performance.

Research Method

The quantitative method use with four variables: two independent variables Audit Fee (X1) and Digital Transformation (X2); one dependent variable Sustainability Performance (Y); and one moderating variable Managerial Ownership (Z). According to Meutia et al. (2025), it emphasizes systematic data collection, hypothesis testing, and numerical analysis to create valid conclusions.

The population of study are energy sector businesses stated on the Indonesia Stock Exchange (IDX) from 2020 to 2023. Samples were determined using the purposive sampling method, which is a sampling technique based on certain considerations and criteria relevant to the research objectives. The sample selection criteria in this study are: (1) the company consistently publishes audited annual financial statements during the 2020–2023 period; (2) The company has managerial ownership; (3) The company publishes sustainability reports using the GRI Standard.

Tabel 1. Determination of Research Sample

No	Sample Criteria	Amount
1	Energy Companies listed on IDX	90
2	The company has financial reports listed on the IDX 2020-2023	(27)
3	Energy sector companies that have managerial share ownership	(13)
4	Energy sector companies that publish sustainability reports using the GRI Standard	(16)
	Companies that meet the criteria	34
	Observation period	4
	Total sample	136

The research sample was determined through a multi-stage screening process. From a total of 90 energy companies listed on the Indonesia Stock Exchange (IDX), 27 companies were excluded due to incomplete financial reports for the 2020–2023 period. Subsequently, 13 companies were eliminated for not having managerial share ownership. Furthermore, 16 companies were excluded as they did not publish sustainability reports in accordance with the GRI Standards. Based on these criteria, 34 companies were selected as the final sample. With an observation period of four years, the study generated a total of 136 firm year observations.

Identification, Operational Definition, and Measurement of Variables

Sustainability Performance was measured using a content analysis-based index, which assesses the extent to which companies disclose sustainability information compared to the total disclosure items expected (Nurmalasari & Kania, 2024).

$$SRDI = \frac{\text{Number of disclosed item}}{\text{Total Number of Expected item}}$$

The dependent variable in this study is Audit Fee. An audit fee is a fee paid by a company to a public accounting firm to conduct an audit of its financial statements (Fung et al., 2012). The audit fee was quantified using the logarithm of nature of the audit charge, signifying the compensation received by the auditor (Natalia et al., 2024).

$$Ln = \text{Audit fee}$$

Digital Transformation refers to the process that changes how companies operate, deliver value, and interact with clients. The measurement of digital transformation was developed through content analysis using four keywords: IoT, Information Technology, Digital Technology, and Smart (Linawati et al., 2024)

$$Ln (\text{Total Number of analyst} + 1)$$

The constant +1 is added to address the possibility of zero values in the data, as the logarithm of zero is undefined. The logarithmic transformation aims to stabilize variance, smooth data distribution, and maintain regression model validity.

The Moderating variable in this study is managerial ownership. Managerial Ownership is the ownership from managers actively involved in company decision-making. The measurement

developed related to ownership structure concepts in corporate governance with management-owned shares to total outstanding shares (Sulyanto & Trisnawati, 2025).

$$MGR = \frac{\sum \text{Managerial Share Ownership}}{\sum \text{Outstanding Shares}} \times 100\%$$

Results and Discussion

Descriptive Statistics

The descriptive statistical test shows variables including the mean, median, maximum, and minimum values.

Tabel 2. Descriptive Statistics Test Results

	Sustainability Performance	Fee Audit	Digital Transformation	Managerial ownership
Mean	0.415787	20.98253	2.756766	0.164657
Median	0.418803	20.86448	2.791759	0.107119
Maximum	3.564103	24.71162	5.043051	1.000000
Minimum	0.034188	15.00459	1.000000	2.533050

Source: Processed data using Eviews 12

Based on the processed data shown in Table 2, the lowest sustainability performance value, namely 0.034188, is owned by PT Transcoal Pasific, Tbk in 2021, meaning that the sustainability performance carried out is still low. The Audit Fee variable (X1) has a minimum value of 15.00459 or 15.00% of approximately Rp3,284,047 shown by the company Medco Energi Internasional Tbk in 2020, this value reflects the lowest audit fee in the sample, which may be caused by the relatively smaller size of the Company, low complexity of financial statements, or the selection of a non-big-four KAP so that audit fees are lower. The Digital Transformation variable has a minimum value of 5.043051 or 5.04% shown by Bukit Asam Tbk. in 2023, this indicates that the level of implementation of digitalization in Company activities is still low, due to limited investment or not yet being a top priority.

Panel Data Regression Test

Tabel 2. Model Selection Results of Panel Data Regression

Uji	Hipotesis	Hasil Uji	Model
Chow test	If probability < 5%, reject H ₀ → use Fixed Effect Model	0.0014	Fixed Effect Model
Hausman test	If probability < 5%, reject H ₀ → use Fixed Effect Model	0.0000	Fixed Effect Model

Source: Processed data using Eviews 12

The Fixed Effect Model (FEM) is the most appropriate model for the research, where the conclusion in line with Chow Test result with a probability value of 0.0014 < 0.05, where FEM is preferable to the Common Effect Model (CEM). The Hausman Test also supports the FEM, with 0.0000 < 0.05 probability score, where FEM provides a better fit than the Random Effect Model (REM). Therefore, the analysis implement Fixed Effect Model (FEM) which more efficient estimates consistent with the data characteristics.

Hypothesis Testing

Hypothesis testing in regression analysis is conducted to examine the partial effect of each independent variable on the dependent variable using a 5% significance level (α = 0.05). An

independent variable is considered to have a statistically significant effect if the probability value is less than 0.05, in which case the hypothesis is accepted. Conversely, if the probability value exceeds 0.05, the independent variable is considered to have no significant effect and the hypothesis is not supported. The results of the hypothesis testing are presented in Table 3.

Table 3. Hypothesis Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	Conclusion
C	4.745465	1.008942	4.707108	0.0000	–
Audit Fee (X1)	0.212955	0.047193	4.513639	0.0000	H1 supported
Digital Transformation (X2)	0.050300	0.054640	0.920559	0.3595	H2 not supported
Managerial Ownership (Z)	11.276840	2.225114	5.066851	0.0000	–
X1 × Z	−0.508115	0.101927	−4.985267	0.0000	H3 not supported
X2 × Z	0.105371	0.316054	0.333166	0.7397	H4 not supported
Prob (F-statistic) = 0.000000					
Adjusted R-Squared = 0.456022					

Source: Processed data using Eviews 12

Based on Table 3, the Prob (F-statistic) value of 0.000000 is lower than the significance level of 0.05, indicating that the regression model is statistically significant. This result suggests that audit fees, digital transformation, managerial ownership, and the interaction variables jointly influence sustainability performance. Furthermore, the adjusted R-squared value of 0.456022 indicates that approximately 45.6% of the variation in sustainability performance can be explained by the variables included in the model, while the remaining 54.4% is influenced by other factors not examined in this study. This moderate explanatory power suggests that sustainability performance is a multidimensional outcome that cannot be fully explained by audit and governance mechanisms alone, highlighting the importance of broader institutional, regulatory, and organizational factors.

The Effect of Audit Fee on Sustainability Performance

The probability value for the audit fee (X1) variable is $0.0000 < 0.05$, indicating that audit fees have a significant effect on corporate sustainability performance. The positive regression coefficient of 0.212955 suggests a positive relationship, meaning that higher audit fees are associated with better sustainability performance. Therefore, Hypothesis 1 is supported. This result indicates that companies allocating higher audit fees tend to obtain higher audit quality, particularly in monitoring and verifying sustainability practices. This finding is consistent with legitimacy theory, which argues that companies seek to gain legitimacy from stakeholders by improving transparency and the quality of corporate reporting, including sustainability reporting. Higher audit fees reflect a firm's commitment to ensuring the reliability of sustainability-related information in order to maintain public and investor trust. The results of this study are consistent with Al Ani et al. (2024) and Kammoun and Khoufi (2023), who find that firms with better sustainability performance tend to pay higher audit fees due to increased complexity and risk associated with sustainability reporting. However, this finding contrasts with Feng (2025), who suggests that superior sustainability performance may reduce audit fees through improvements in internal reporting systems. These differences indicate that the effect of audit fees on sustainability performance remains contingent on firm-specific characteristics and institutional contexts.

The Effect of Digital Transformation on Sustainability Performance

The probability value for digital transformation (X2) is $0.3595 > 0.05$, indicating that digital transformation does not have a statistically significant effect on corporate sustainability performance. Although the regression coefficient is positive (0.050300), the effect is not sufficiently strong from a

statistical perspective. Therefore, Hypothesis 2 is not supported. This finding suggests that the implementation of digital transformation has not yet directly contributed to improvements in corporate sustainability performance. From the perspective of legitimacy theory, digital transformation is expected to enhance transparency, accountability, and the quality of sustainability disclosure in order to strengthen legitimacy in the eyes of stakeholders. However, the results indicate that firms still prioritize digitalization for operational efficiency and economic performance rather than strategically integrating it into sustainability initiatives. This finding is consistent with Yang and Han (2023) as well as the nonlinear evidence reported by Al Ani (2024), which suggests that digital transformation does not always translate into improved ESG performance. In contrast, this result differs from Chen and Ren (2025) and Li et al. (2024), who document that digital transformation can enhance sustainability performance when it is strongly aligned with ESG governance and policies. These differences imply that the impact of digital transformation on sustainability performance critically depends on the depth of implementation and firms' strategic orientation.

The Effect of Audit Fee on Sustainability Performance with Managerial Ownership as a Moderating Variable

The results indicate that the interaction between audit fees and managerial ownership does not have a significant effect on corporate sustainability performance. This is evidenced by the interaction significance value exceeding 0.05, suggesting that managerial ownership is unable to moderate the relationship between audit fees and sustainability performance. Accordingly, Hypothesis 3 is not supported. This finding implies that the proportion of shares held by management is not sufficiently strong to reinforce the role of audit fees in enhancing sustainability performance. From the perspective of legitimacy theory, although managerial ownership is expected to align the interests of managers and shareholders, the results suggest that legitimacy driven sustainability practices are more strongly influenced by external pressures, such as regulatory requirements and stakeholder expectations, than by internal ownership structures. This finding is consistent with Alves (2023), who reports that the effect of managerial ownership on audit fees is nonlinear and not always effective as a governance mechanism. However, the result contrasts with Ongsakul et al. (2021) and Shan et al. (2021), who document that managerial ownership can strengthen corporate social responsibility practices and sustainability transparency. These differences indicate that the moderating role of managerial ownership is highly context-dependent.

The Effect of Digital Transformation on Sustainability Performance with Managerial Ownership as a Moderating Variable

The probability value for the interaction variable Digital Transformation \times Managerial Ownership ($X_2 \times Z$) is $0.7397 > 0.05$, indicating that managerial ownership is unable to moderate the effect of digital transformation on corporate sustainability performance. Although the interaction coefficient is positive ($\beta = 0.105371$), it is not statistically significant therefore, Hypothesis 4 is not supported. This finding suggests that while digital transformation has the potential to support sustainability initiatives, the level of managerial share ownership is not sufficiently strong to amplify its impact on sustainability performance. From the perspective of legitimacy theory, firms are expected to leverage digital transformation to enhance transparency and accountability in sustainability practices in order to gain stakeholder legitimacy. However, the results indicate that legitimacy-driven digitalization is not determined by managerial ownership structure. This finding contrasts with Chen and Ren (2025), who document that digital transformation improves ESG performance, as well as Chen et al. (2025), who find that executive ownership incentives enhance ESG outcomes. In contrast, the result is consistent with Ongsakul et al. (2021) and Shan et al. (2021), who report that the effect of managerial ownership on sustainability practices and disclosures may be weak or even negative under certain conditions.

Conclusion

The results of this study indicate that audit fees have a positive effect on sustainability performance, suggesting that higher audit costs enhance the quality of monitoring and the credibility of corporate sustainability reporting. Conversely, digital transformation does not show a significant impact, as digitalisation in the energy sector remains focused on operational efficiency rather than the achievement of ESG objectives. Another finding reveals that managerial ownership weakens the relationship between audit fees and sustainability performance and does not moderate the effect of digital transformation, indicating that managerial priorities are more oriented towards cost efficiency and internal strategies than leveraging external audit mechanisms to promote sustainability.

The implications of these findings support the need to strengthen audit regulation in Indonesia, particularly to ensure that auditors integrate ESG aspects into audit procedures in line with the development of SPAP standards and increasing demands for transparency. These results are also aligned with the OJK ESG framework through POJK 51/2017 and the Green Taxonomy which requires energy companies to enhance the accuracy and quality of sustainability reporting as part of their governance responsibilities. Adequate audit fees can serve as a mechanism for companies to meet regulatory expectations and enhance legitimacy in the eyes of stakeholders. Furthermore, companies should direct digitalisation not only toward efficiency but also toward emission tracking systems, ESG data management, and more accurate reporting.

For future research, it is recommended to develop models incorporating external factors such as regulatory pressure, governance quality, and the company's environmental risk level, as these variables may influence the relationships between audit fees, digitalisation, and sustainability. The assessment of sustainability performance should also evolve from mere disclosure quantity to content quality evaluation, including the integration of emerging standards such as ISSB and GRI 2025. Additionally, future studies may expand to other sectors, adopt a longitudinal approach, and explore the role of emerging technologies such as ESG big data analytics, AI, and blockchain, which have the potential to transform audit mechanisms and sustainability reporting in the future.

References

- Ahmad, S., & Wong, K. Y. (2019). Development of weighted triple-bottom line sustainability indicators for the Malaysian food manufacturing industry using the Delphi method. *Journal of Cleaner Production*, 229, 1167–1182.
- Al Amosh, H., & Khatib, S. F. A. (2022). Ownership structure and environmental, social and governance performance disclosure: The moderating role of the board independence. *Journal of Business and Socio-Economic Development*, 2(1), 49–66. <https://doi.org/10.1108/JBSED-07-2021-0094>
- Al Ani, M. K., Al-Subiri, F., & Al-Shaer, H. (2024). Sustainable products and audit fees: Empirical evidence from western European countries. *Sustainability Accounting, Management and Policy Journal*. <https://doi.org/10.1108/SAMPJ-03-2023-0131>
- Alves, S. (2023). The impact of managerial ownership on audit fees: Evidence from Portugal and Spain. *Cogent Economics & Finance*, 11(1), 2163078. <https://doi.org/10.1080/23322039.2022.2163078>
- Anam, M., Khurram, S., Shah, S. N., Asghar, M., & Umar, M. N. (2025). Assessing the Impact of Digital Transformation on HR Practices in Pakistani Organizations. *Dialogue Social Science Review (DSSR)*, 3(6), 337–352.
- Aziz, S., & Najicha, F. U. (2024). Peran Pendidikan Pancasila Dalam Mewujudkan Cita-Cita Sustainable Development Goals (SDGs) di Indonesia. *Jurnal Pendidikan Kewarganegaraan*,

8(1), 11–21.

- Chen, L., Mao, C., & Gao, Y. (2025). Executive equity incentives and corporate environmental, social and governance performance. *Frontiers in Sustainability*. <https://doi.org/10.3389/frsus.2025.1637126>
- Chen, X., Liu, X., & Zhu, Q. (2023). Digital transformation and enterprise ESG performance. *PLOS ONE*, *19*(4), e0302029. <https://doi.org/10.1371/journal.pone.0302029>
- Chen, Y., & Ren, J. (2025). How does digital transformation improve ESG performance? Empirical research from 396 enterprises. *International Entrepreneurship and Management Journal*. <https://doi.org/10.1007/s11365-024-01011-2>
- Choiriah, S., & Angin, M. P. (2025). Determinant of Sustainability Report Quality in the Energy Sector. *KnE Social Sciences*, *10*(21), 25–36.
- Climate Transparency. (2020). *Indonesia country profile 2020*. Climate Transparency.
- Dakhli, A. (2022). The impact of corporate social responsibility on firm financial performance: Does audit quality matter? *Journal of Applied Accounting Research*, *23*(5), 950–976. <https://doi.org/10.1108/JAAR-06-2021-0150>
- Fang, M., Nie, H., & Shen, X. (2023). Can enterprise digitization improve ESG performance? *Economic Modelling*, *118*, 106101. <https://doi.org/10.1016/j.econmod.2022.106101>
- Feng, Y. (2025). The impact of ESG performance on audit fees: Evidence from Chinese listed companies. In *Proceedings of the 2025 International Conference on Financial Innovation and Marketing Management* (Pp. 277–285). Atlantis Press. https://doi.org/10.2991/978-94-6463-874-5_35
- Fitriani, A. (2025). *Pengaruh Green Investment dan Green Strategy Terhadap Carbon Emission Disclosure pada Perusahaan Sektor Energi yang terdaftar di ISSI*. Universitas Malikussaleh.
- Friedlingstein, P., O’Sullivan, M., Jones, M. W., Andrew, R. M., Bakker, D. C. E., Hauck, J., Landschützer, P., Le Quéré, C., Luijkx, I. T., Peters, G. P., Peters, W., Pongratz, J., Schwingshackl, C., Sitch, S., Canadell, J. G., Ciais, P., Jackson, R. B., Jackson, R. B., & B. (2023). Global Carbon Budget. *Earth System Science Data*, *15*(12), 5301–5369. <https://doi.org/10.5194/essd-15-5301-2023>
- Fung, S. Y. K., Gul, F. A., & Krishnan, J. (2012). City-level auditor industry specialization, economies of scale, and audit pricing. *The Accounting Review*, *87*(4), 1281–1307.
- Hongming, X., Ahmed, B., Hussain, A., Rehman, A., Ullah, I., & Khan, F. U. (2020). Sustainability reporting and firm performance: The demonstration of Pakistani firms. *Sage Open*, *10*(3).
- ITM Sustainability Report 2023. Responsible transition for a greener future. Retrieved from https://www.itmg.co.id/files/sustainability_assets/SR%20ITM%202023.pdf
- Jeurissen, R. (2000). John Elkington, Cannibals With Forks: The Triple Bottom Line of 21st Century Business. *Journal of Business Ethics*, *23*, 229–231.
- Jiang, F. (2025). Digital transformation and green innovation: The mediating role of green management disclosure and the moderating role of institutional pressure. *Strategic Change*, *34*(1), 1–15. <https://doi.org/10.1177/03063070241308100>
- Kammoun, I., & Khoufi, W. (2023). Sustainable performance, conditional conservatism and audit fees. *Journal of Financial Reporting and Accounting*. <https://doi.org/10.1108/JFRA-10-2022-0396>
- Li, L. (2022). Digital transformation and sustainable performance: The moderating role of market turbulence. *Industrial Marketing Management*, *104*, 28–37.

- Li, Y., Zheng, Y., Li, X., & Mu, Z. (2024). The impact of digital transformation on ESG performance. *International Review of Economics & Finance*. <https://doi.org/10.1016/j.iref.2024.103686>
- Linawati, L., Syailendra, S., & Darmansyah, D. (2024). Pengaruh Digital Intellectual Capital Dan Inovasi Berkelanjutan Terhadap Kinerja Keuangan: Peran Mediasi Reputasi Perusahaan Dan Moderasi Transformasi Digital. *Jurnal Akuntansi Dan Bisnis Indonesia (JABISI)*, 5(2), 159–170.
- Liu, Y., Wang, H., & Zhang, L. (2024). How effective is digital transformation? Heterogeneous insights from listed companies' ESG performance. *Humanities and Social Sciences Communications*, 11, 1567. <https://doi.org/10.1057/s41599-024-04039-5>
- Liu, Z., Chen, Z., & Hu, L. (2024). Can enterprise digital transformation improve ESG performance? *Managerial and Decision Economics*, 45, 5088–5103. <https://doi.org/10.1002/mde.4225>
- Meutia, Taqi, M., Anasta, L., Juliansah, I., Utami, W., & Choiriah, S. (2025). *Rabasia Praktis Menuntaskan Penelitian dengan Efektif*. Salemba Empat.
- Molho, C., Monteiro, S., & Montez, P. (2025). The digitalization of corporate sustainability reporting: Opportunities and challenges. In *Human-Centred Technology Management for a Sustainable Future (LAMOT 2024)*. Springer., 417–424. https://doi.org/10.1007/978-3-031-72494-7_41
- Muaffa, M. A., & Rohman, A. (2025). Strategi Optimalisasi Aspek Operasional Dalam Bisnis Modern di Era Perkembangan Digital. *Improvement: Jurnal Manajemen Dan Bisnis*, 5(1), 46–52.
- Natalia, L., Widarsono, A., & Widyaningsih, A. (2024). The role of auditee, auditor, and engagement to audit fee at SOEs. In *Proceeding International Conference on Accounting and Finance*, 11–24.
- Nicolò, G., Zanellato, G., Tiron-Tudor, A., & Tartaglia-Polcini, P. (2021). Integrated reporting and European state-owned enterprises: A disclosure analysis pre and post 2014/95/EU. *Sustainability*, 13(3), 1187. <https://doi.org/10.3390/su13031187>
- Nurmalasari, N., & Kania, D. (2024). The Role Of Green Investment On Sustainable Performance With Financial Performance As A Mediating Variable (Case Studies On Manufacturing Industrial Companies Listed On The Idx For The 2018-2022 Period). *Seminar Nasional Parivisata Dan Kewirausahaan (SNPK)*.
- Oktariyani, A. (2024). Analisis Pengungkapan Emisi Karbon Perusahaan dalam Laporan Tahunan dan Keberlanjutan Subsektor Transportasi sebagai Bentuk Legitimasi Perusahaan. *Equivalent: Journal of Economic, Accounting and Management*, 2(2), 487–500.
- Ongsakul, V., Jiraporn, P., & Treepongkaruna, S. (2021). Does managerial ownership influence corporate social responsibility (CSR)? The role of economic policy uncertainty. *Accounting & Finance*. <https://doi.org/10.1111/acfi.12592>
- Peng, Y., Chen, H., & Li, T. (2023). The impact of digital transformation on ESG: A case study of Chinese-listed companies. *Sustainability*, 15(20), 15072. <https://doi.org/10.3390/su152015072>
- Shan, Y. G., Tang, Q., & Zhang, J. (2021). The impact of managerial ownership on carbon transparency: Australian evidence. *Journal of Cleaner Production*, 317, 128480. <https://doi.org/10.1016/j.jclepro.2021.128480>
- Song, Y., Wu, H., & Ma, Y. (2023). Does ESG performance affect audit pricing? Evidence from China. *International Review of Financial Analysis*, 90, 102890.

<https://doi.org/10.1016/j.irfa.2023.102890>

- Sulyanto, P., & Trisnawati, E. (2025). Earnings Quality , Good Corporate Governance , Audit Quality and Firm Value : Moderated of Leverage. *Sentralisasi Universitas Muhammadiyah Sorong*, 192–218.
- Sun, Y., Davey, H., Arunachalam, M., & Cao, Y. (2022). Towards a theoretical framework for the innovation in sustainability reporting: An integrated reporting perspective. *Frontiers in Environmental Science*, 10, 935899. <https://doi.org/10.3389/fenvs.2022.935899>
- United Nations. (2024). *The Sustainable Development Goals Report 2024*. United Nations. <https://unstats.un.org/sdgs/report/2024/>
- Wang, J., Et, & Al. (2025). The nonlinear impact of ESG performance on audit pricing: Evidence from China. *PLOS ONE*, 20, e0331504. <https://doi.org/10.1371/journal.pone.0331504>
- Wu, S., Li, X., Du, X., & Li, Z. (2022). The impact of ESG performance on firm value: The moderating role of ownership structure. *Sustainability*, 14(21), 14507.
- Yang, Y., & Han, J. (2023). Digital transformation, financing constraints, and corporate environmental, social and governance performance. *Corporate Social Responsibility and Environmental Management*, 30(6), 3189–3202. <https://doi.org/10.1002/csr.2546>
- Yen, J. C., Lim, J. H., Wang, T., & Hsu, C. (2018). The impact of audit firms' characteristics on audit fees following information security breaches. *Journal of Accounting and Public Policy*, 37(6), 489–507.
- Zahid, R. A., Taran, A., Khan, M. K., & Simga-Mugan, C. (2023). The effect of ownership composition on corporate financial performance in the European frontier markets. *Baltic Journal of Management*, 18(2), 242–261. <https://www.emerald.com/insight/content/doi/10.1108/BJM-12-2021-0457/full/html>
- Zhang, K., Liu, X., & Wang, J. (2023). Exploring the relationship between corporate ESG information disclosure and audit fees: Evidence from non-financial A-share listed companies in China. *Frontiers in Environmental Science*, 11, 1196728. <https://doi.org/10.3389/fenvs.2023.1196728>
- Zheng, X., & Bu, Q. (2024). Enterprise ESG performance, digital transformation, and firm performance: Evidence from China. *SAGE Open*, 14(4). <https://doi.org/10.1177/21582440241291680>