

Internal Audit Effectiveness in Reducing Greenwashing Risk Through ESG Internal Controls and Audit Committee Governance

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Abstract - There have been rising concerns related to the risk of greenwashing that is likely due to environmental claims made by an organization exceeding its performance. Although previous studies have focused on sustainability disclosure and assurance practices, there has not been much literature on organizational factors that increase the credibility of ESG information and mitigate the risk of greenwashing. In this study, the impact of IAF effectiveness on greenwashing risk via the ESG internal control quality is explored, along with examining the moderating effect of the audit committee effectiveness. A cross-sectional research design was adopted for this study, with 420 valid responses collected from practitioners involved in internal auditing, finance, risk management, ESG, sustainability, and board activities. Reliability and validity analysis was performed on the constructs, and then conditional process analysis using HC3 robust standard errors with 5,000 bootstrap resamples was performed. Results indicate that IAF effectiveness significantly impacts ESG internal control quality ($\beta = 0.499$, $p < 0.001$) while ESG internal control quality has a significant negative impact on greenwashing risk ($\beta = -0.437$, $p < 0.001$). Similarly, IAF effectiveness has a significant negative direct impact on greenwashing risk ($\beta = -0.111$, $p = 0.036$). The mediating role of ESG internal control quality between IAF effectiveness and greenwashing risk is confirmed with the mediation analysis, with a significant indirect effect ($\beta = -0.218$, 95% CI [-0.286, -0.156]). Additionally, the role of audit committee effectiveness as a moderator in the relationship between IAF effectiveness and ESG internal control quality is supported by a moderated mediation effect ($\beta = 0.101$, $p = 0.007$).

Keywords: Internal Audit Function, Greenwashing Risk, ESG Internal Controls, Audit Committee Effectiveness, Sustainability Assurance, Moderated Mediation

I. INTRODUCTION

Currently, sustainability reporting is seen as an integral part of corporate responsibility in the era when the growing number of stakeholders relies on ESG information to make decisions. Nevertheless, the growing amount of ESG reporting leads to an increased concern about potential greenwashing, when the environmental claims made by organizations go beyond their capabilities of delivering them. Research suggests that greenwashing may be caused by selective disclosure, exaggeration of environmental statements, and inconsistency between the reported sustainability performance and environmental outcomes

(Bernini & La Rosa, 2024). While there were several studies exploring the issues of sustainability disclosure and assurance mechanisms, little is known about internal organization-based mechanisms that help to avoid misleading ESG claims. In light of this, further investigation of the mechanisms to ensure the credibility of sustainability information is highly needed.

The importance of this study can be defined through its consideration of the impact of the effectiveness of the internal audit function (IAF) in reducing the risk of greenwashing through improvement of the internal ESG controls. Internal audit effectiveness is determined by several factors, including independence, professional skills, organizational readiness, and resources required to assess sustainability risks (Calvin, 2021). Previous studies have shown that internal audit involvement is associated with assurance and reporting of ESG issues (DeSimone et al., 2021). However, the mechanisms of impact of internal audit effectiveness on reducing the greenwashing risk need to be further investigated. For this purpose, ESG internal controls quality will be analyzed as the mediating variable and audit committee effectiveness will be considered as the governance variable in this relationship.

The study offers three major contributions to the field. First, it proposes a theoretical framework that explains how internal audit effectiveness influences greenwashing risk reduction through better ESG internal controls. Second, it emphasizes the importance of audit committee effectiveness in improving the impact of internal audit capabilities on the development of ESG internal controls (Rakipi & D'Onza, 2024). Third, it makes an extension of the sustainability governance research by focusing not only on the issue of reporting but also on information credibility.

Research Hypothesis

H1: IAF effectiveness is positively associated with ESG internal control quality.

H2: ESG internal control quality is negatively associated with greenwashing risk.

H3: IAF effectiveness is negatively associated with greenwashing risk.

H4: ESG internal control quality mediates the negative association between IAF effectiveness and greenwashing risk.

H5: Audit committee effectiveness positively moderates the relationship between IAF effectiveness and ESG internal control quality, such that the relationship is stronger at higher levels of audit committee effectiveness.

H6: The indirect negative association between IAF effectiveness and greenwashing risk through ESG internal control quality is stronger when audit committee effectiveness is higher.

II. LITERATURE REVIEW

Sustainability reporting has become especially relevant for companies amid the growing pressure on providing trustworthy environmental, social, and governance (ESG) data. At the same time, an increase in the amount of sustainability disclosures leads to problems associated with possible greenwashing. Greenwashing consists of matters such as selectivity in disclosing information, exaggeration of environmental claims, and inconsistency between sustainability stories and proof (Bernini & La Rosa, 2024). Greenwashing perceptions may affect stakeholder confidence and environmental perception (Szabo & Webster, 2021). The present research models include the measure of greenwashing in relation to the gap between perceived and actual environmental performance (Dorfleitner & Utz, 2024). A systematic review of the literature indicates that increasing sustainability report credibility requires improvements in assuring practices, governance, and technology used to monitor ESG data (Moodaley & Telukdarie, 2023).

The scope of IAFs has recently extended beyond traditional financial monitoring to include sustainability assurance and ESG risks. Effectiveness of internal audit operations is ensured by the factors of independence, objectivity, professional competence, availability of proper resources, and organizational maturity (Calvin, 2021). It was found that the involvement of IAFs in sustainability audits depends on organizational characteristics, risk assessments, and ESG competencies (DeSimone et al., 2021). The maturity level of internal audit operations enables them to conduct the assurance and advisory work related to the new sustainability risks (D'Onza et al., 2020). ESG assurance practices research proves that internal auditors facilitate the process of ESG disclosure by assessing the quality of the ESG information and control systems, and conducting assurance procedures (Bonrath et al., 2022). Development of ESG assurance function within internal audit operations presupposes special skills, strategic positioning, and organizational support (Hecimovic & Canestrari-Soh, 2025). The above information suggests that effective IAFs can help improve the reliability of sustainability information.

ESG internal controls play a very crucial role in achieving the verifiability, transparency, and accuracy of sustainability reporting. Internal controls enhance ownership, standardization, validation, evidence handling, and remediation of ESG data. Studies on the integration of ESG into internal control systems have proven that internal controls facilitate sustainability assurance and improve sustainability reporting (Harasheh & Provasi, 2023). In addition, internal control processes have been found to be useful in enhancing environmental disclosure quality by mitigating weaknesses in information and monitoring processes (Tan et al., 2020). Environmental performance research has shown that effective enterprise internal controls lead to better environmental results and sustainability management (Tao et al., 2023). Moreover, ESG assurance literature reveals that internal control readiness is vital in achieving the requirements of external assurance (Bakarich et al., 2023). Validity and reliability tests of governance-related constructs are also required in measurement and validation to improve the accuracy of research models (Henseler et al., 2015).

Corporate governance mechanisms, especially audit committee effectiveness, help increase the efficiency of ESG oversight and decrease sustainability reporting risks. The audit committee helps provide reporting credibility by means of independence, expertise, monitoring, and following up on control deficiencies within the organization (Al-Shaer & Zaman, 2018). There is scientific evidence that shows the impact of the audit committee on the quality and quantity of ESG reporting (Arif et al., 2021). Governance mechanisms are also known to help with improving sustainability reporting practices in various organizational settings (Bamahros et al., 2022). The interaction between the audit committee and internal audit helps explain the role of the oversight structure in improving internal audit and control (Abbott et al., 2010). New research also confirms the positive impact of cooperation between the internal audit and governance mechanisms on ESG risk management and assurance (Rakipi & D'Onza, 2024). Finally, the corporate governance and assurance mechanisms were found to be an important factor that influenced environmental greenwashing outcomes (Frendy et al., 2024). In this way, integrating internal audit effectiveness, ESG internal controls, and audit committee effectiveness helps explain the mechanisms that can mitigate greenwashing risks.

The literature review reveals that greenwashing risk is highly related to the reliability of sustainability information and the efficiency of governance practices. Literature suggests that an effective internal audit process, good ESG internal controls, and oversight from audit committees can enhance reporting credibility. Nonetheless, further empirical research is needed to examine how these elements collectively mitigate greenwashing risk.

III.METHODOLOGY

Fig. 1 shows the proposed conceptual framework on how the efficacy of the IAF, quality of internal control for ESG, audit committee effectiveness, and greenwashing risk can be linked. The proposed framework suggests that the

effectiveness of the IAF enhances the internal control quality for ESG, which in turn lowers greenwashing risk. Audit committee effectiveness is proposed to moderate the relationship between internal audit effectiveness and ESG internal control quality.

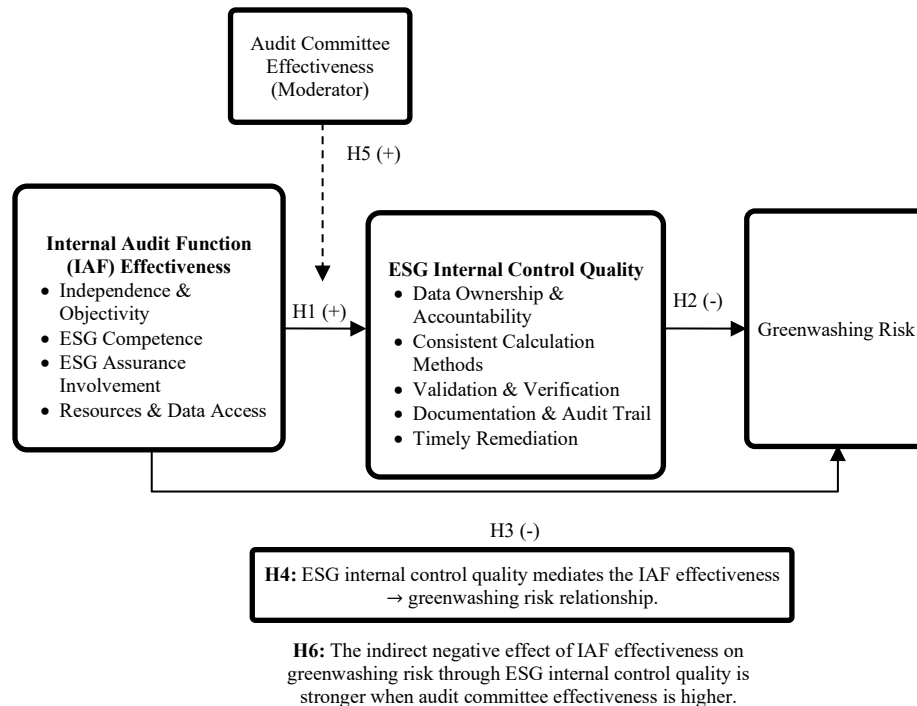


Fig. 1 Conceptual Model of Internal Audit Effectiveness ESG Internal Controls and Greenwashing Risk

3.1 Research Design and Analysis Sample

The research follows a cross-sectional research methodology based on respondents' data, with a total number of 420 responses used from the research database. The respondents have positions that are related to internal auditing, financial management, risk management, ESG, sustainability, and board oversight. There are no missing values in the data for the measures used. The participants included internal auditors (33.1%), audit executives/managers (22.4%), financial managers (12.9%), risk managers (12.4%), ESG managers (12.1%), and audit committee/board members (7.1%). The organizations included different sectors such as manufacturing, technology, financial services, energy, construction, and retail industries (Table I).

This study employs a respondent-driven sampling method that consists of people who have professional understanding regarding the process of internal audit, ESG reporting, risk management, sustainability practices, and governance monitoring. Respondents have been selected in view of their organizational position in terms of internal audit, financial and accounting matters, risk and compliance, ESG and sustainability management, or audit committee and board level monitoring. The dataset generated through this process was filtered in order to consider those responses which pertain to the research model, leading to 420 valid cases. No

missing values were there for the key measures of interest in this sample set.

TABLE I SAMPLE PROFILE (N = 420)

Characteristic	Category	n	%
Respondent role	Internal auditor	139	33.1
	Chief audit executive / internal audit manager	94	22.4
	Finance / accounting manager	54	12.9
	Risk / compliance manager	52	12.4
	ESG / sustainability manager	51	12.1
	Audit committee / board member	30	7.1
Experience	3–5 years	76	18.1
	6–10 years	152	36.2
	11–15 years	101	24.0
	16+ years	91	21.7
Sector	Manufacturing	125	29.8
	Technology & business services	73	17.4
	Financial services	69	16.4
	Energy & utilities	65	15.5
	Construction & real estate	49	11.7
	Consumer & retail	39	9.3
Firm size	100–249 employees	70	16.7
	250–499 employees	107	25.5
	500–999 employees	116	27.6
	1,000+ employees	127	30.2
Listing status	Listed	237	56.4
	Unlisted	183	43.6
ESG reporting experience	0–2 years	97	23.1
	3–5 years	194	46.2
	6+ years	129	30.7

3.2 Measures

All the constructs were measured using multi-item Likert type scales, and scores for each construct were obtained using the average of the individual items constituting the construct. The higher the score, the stronger the construct was measured. The IAF effectiveness construct was modeled as a higher-order composite that comprised four dimensions: independence and objectivity, ESG competence, ESG assurance participation, and resources and data capability.

The ESG internal controls quality construct was measured using five items concerning data ownership, standardization in measurements, validation, data retention, and remediation of control weakness. Audit Committee Effectiveness was measured using five items, namely ESG oversight, ESG expertise, effectiveness of meetings, review of internal audit observations, and follow-up. The greenwashing risk construct was measured using six items including unsubstantiated environmental claims, selective disclosures, poor evidence, and mismatch between sustainability narrative and performance.

TABLE II CONSTRUCT OPERATIONALIZATION

Construct/ dimension	Codes	Items	Main literature basis
IAF independence/ objectivity	IND1–IND3	3	(Calvin, 2021; D'Onza et al., 2020; Rakipi & D'Onza, 2024)
IAF ESG competence	COMP1–COMP3	3	(DeSimone et al., 2021; Hecimovic & Canestrari-Soh, 2025)
IAF ESG assurance involvement	INV1–INV3	3	(DeSimone et al., 2021; Bonrath et al., 2022; Rakipi & D'Onza, 2024)
IAF resources/data capability	RES1–RES3	3	(D'Onza et al., 2020; Bakarich et al., 2023)
ESG internal control quality	IC1–IC5	5	(Bamahros et al., 2022; Tao et al., 2023)
Audit committee effectiveness	AC1–AC5	5	(Arif et al., 2021)
Greenwashing risk	GW1–GW6	6	(Dorfleitner & Utz, 2024; Frendy et al., 2024)

Table II provides the operationalization of the constructs used in the research. There are four dimensions of the IAF effectiveness construct, and ESG internal control quality, audit committee effectiveness, and greenwashing risk are considered separate constructs. Every construct is measured by several items reflecting certain practices of the organizations regarding ESG governance, reporting controls, audit function, and sustainability risk management.

3.3 Controls

Five organization-level controls are included because firm characteristics may be associated with the development of reporting systems and governance processes. Firm size is coded as an ordinal variable across four employee categories. Listing status is coded 1 for listed organizations and 0 for unlisted organizations. ESG reporting experience is coded as an ordinal variable (0–2, 3–5, and 6+ years). Foreign ownership is coded across four categories from 0% to 50% or more. Firm age is measured in years. Except for the binary listing variable, controls are standardized before estimation.

3.4 Analytical Strategy

Four steps were followed for the analysis. In the first step, properties of the samples and the construct distribution were analyzed. In the second step, measurement quality was determined through analysis of Cronbach's alpha, standardized factor loadings, composite reliability, average variance extracted, correlation among constructs, and HTMT. The four dimensions of IAF effectiveness were aggregated into a high-order construct score. In the third step, hypothesis testing was done through a regression based conditional process model. The relationship between variables was analyzed through standardized constructs. The prediction of ESG internal controls was done using IAF effectiveness, audit committee effectiveness, interaction, and control variables, while that of greenwashing risk was done through IAF effectiveness, ESG internal controls, audit committee effectiveness, and controls. The indirect effects were tested through 5,000 bootstrap samples. In the fourth step, robustness analysis was conducted using variance inflation factors and common method variance diagnostics.

Statistical analyses were performed using appropriate statistical software for data screening, descriptive analysis, measurement validation, and hypothesis testing. Reliability and validity assessments included Cronbach's alpha, standardized factor loadings, composite reliability, average variance extracted, and HTMT analysis. Regression-based conditional process analysis was conducted with HC3 robust standard errors and 5,000 bootstrap resamples to evaluate mediation, moderation, and conditional indirect effects.

IV. RESULTS

4.1 Descriptive Statistics and Measurement Diagnostics

Descriptive statistics provide evidence of sufficient variation within the four variables where mean value is in the range of 4.245 and 4.404. The measures of skewness and kurtosis indicate acceptable distribution characteristics without any drastic departures. Reliability and validity measurements prove internal consistency, as evident by alpha values that exceed the acceptable limit, along with acceptable composite reliability and average variance extracted. The higher-order construct of IAF effectiveness has been supported by high factor loadings of its four dimensions.

Table III highlights reliability and convergent validity values by indicating item numbers, Cronbach's alpha, loading range, composite reliability, and AVE for all constructs. In table IV, correlation coefficient and HTMT ratio values have confirmed discriminant validity across constructs. The

HTMT ratio values are still well below the acceptable level, while correlations support theoretically valid relationships between IAF effectiveness, ESG internal control, audit committee effectiveness, and greenwashing risk.

TABLE III RELIABILITY AND CONVERGENT-VALIDITY DIAGNOSTICS

Scale	Items	α	Loading range	CR	AVE
IAF independence/objectivity	3	0.832	0.847–0.878	0.899	0.749
IAF ESG competence	3	0.829	0.844–0.894	0.898	0.746
IAF ESG assurance involvement	3	0.823	0.839–0.885	0.895	0.739
IAF resources/data capability	3	0.826	0.850–0.873	0.896	0.742
IAF effectiveness (12 items)	12	0.933	0.702–0.814	0.942	0.575
ESG internal control quality	5	0.888	0.790–0.860	0.918	0.692
Audit committee effectiveness	5	0.879	0.790–0.845	0.912	0.675
Greenwashing risk	6	0.910	0.785–0.872	0.930	0.690

TABLE IV CORRELATIONS AND HTMT RATIOS

Construct	1	2	3	4
1. IAF effectiveness	1.000	0.636	0.328	−0.437
2. ESG internal control quality	0.699	1.000	0.416	−0.563
3. Audit committee effectiveness	0.362	0.470	1.000	−0.340
4. Greenwashing risk	0.475	0.627	0.380	1.000

4.2 Hypothesis Tests

Table V shows the conditional process analysis results. In the first-stage model, there is a positive relationship between IAF effectiveness and ESG internal control quality ($\beta = .499$, robust SE = .042, $p < .001$). Thus, H1 is supported. Audit committee effectiveness is also positively associated with ESG internal control quality ($\beta = .207$, $p < .001$). The model accounts for 49.6% of the variation in ESG internal control

quality (adjusted $R^2 = .487$). Firm size and ESG reporting experience are positive controls, whereas listing status, foreign ownership, and firm age are not significant.

In the greenwashing-risk model, ESG internal control quality is negatively associated with greenwashing risk ($\beta = -.437$, robust SE = .057, $p < .001$), which is consistent with H2. The negative direct association between IAF effectiveness and greenwashing risk after controlling for the mediator ($\beta = -.111$, robust SE = .053, $p = .036$) confirms H3. In addition, there is a negative association between audit committee effectiveness and greenwashing risk ($\beta = -.113$, $p = .014$). Although this relationship is not the primary moderation hypothesis, it contributes to reducing the greenwashing risk. The model explains 34.2% of the variance in greenwashing risk (adjusted $R^2 = .329$). In none of the five controls are there any significant relationships in the model.

TABLE V CONDITIONAL PROCESS REGRESSION RESULTS

Predictor	β	HC3 SE	p	95% CI
Outcome: ESG internal control quality				
IAF effectiveness	0.499	0.042	< .001	[0.417, 0.581]
Audit committee effectiveness	0.207	0.040	< .001	[0.129, 0.286]
IAF $\times$ audit committee	0.101	0.037	0.007	[0.028, 0.174]
Firm size	0.108	0.038	0.004	[0.034, 0.182]
Listed status	0.090	0.071	0.208	[−0.050, 0.230]
ESG reporting experience	0.129	0.038	0.001	[0.053, 0.204]
Foreign ownership	−0.041	0.035	0.245	[−0.111, 0.028]
Firm age	−0.001	0.034	0.987	[−0.067, 0.066]
Model fit	$R^2 = 0.496$	Adj. $R^2 = 0.487$		
Outcome: Greenwashing risk				
IAF effectiveness	−0.111	0.053	0.036	[−0.215, −0.007]
ESG internal control quality	−0.437	0.057	< .001	[−0.548, −0.325]
Audit committee effectiveness	−0.113	0.046	0.014	[−0.203, −0.023]
Firm size	−0.032	0.044	0.462	[−0.117, 0.053]
Listed status	−0.059	0.084	0.484	[−0.224, 0.106]
ESG reporting experience	0.023	0.045	0.610	[−0.065, 0.111]
Foreign ownership	−0.031	0.043	0.469	[−0.116, 0.054]
Firm age	−0.018	0.039	0.651	[−0.094, 0.059]
Model fit	$R^2 = 0.342$	Adj. $R^2 = 0.329$		

Note. Focal continuous variables and non-binary controls are standardized. β values are standardized regression coefficients for the focal continuous variables. Confidence intervals use HC3 robust standard errors.

The mediation test results support H4. In the total effect model where ESG internal control quality is excluded, there is a negative association between IAF effectiveness and greenwashing risk ($\beta = -.329$, $p < .001$). With ESG internal control quality included in the model, the direct effect becomes smaller ($\beta = -.111$) but still significant. The bootstrap indirect effect of IAF effectiveness on greenwashing risk at the mean level of audit committee effectiveness is $-.218$, with the 95% bootstrap confidence interval $[-.286, -.156]$. Because the confidence interval does not include zero, and the direct effect is still negative, it indicates partial mediation.

4.3 Moderation and Conditional Indirect Effects

The effect of IAF effectiveness on audit committee effectiveness is positive and significant for ESG internal control ($\beta = .101$, $p = .007$). The addition of the interaction term raises R^2 by .0118, the local effect size being $f^2 = .024$. Hypothesis 5 is thus confirmed, albeit with the interaction effect having very small size. The IAF effectiveness simple slope on ESG internal control quality increases from .398 if

audit committee effectiveness is one standard deviation below the mean to .499 if audit committee effectiveness equals the mean value and to .600 if audit committee effectiveness equals one standard deviation above the mean. Fig. 2 shows that the higher the audit committee effectiveness, the higher the effect of IAF effectiveness on ESG internal control quality.

The conditional indirect effects provide evidence for Hypothesis 6. The indirect effect of IAF effectiveness on greenwashing risk through ESG internal control is $-.174$ (95% CI $[-.237, -.116]$) at low audit committee effectiveness, $-.218$ (95% CI $[-.286, -.156]$) at the mean level and $-.262$ (95% CI $[-.353, -.186]$) at high audit committee effectiveness. All intervals do not include zero, the absolute values increasing with the increase in audit committee effectiveness. This pattern indicates first-stage moderated mediation, where the audit committee effectiveness moderates the relationship between IAF effectiveness and the construction of ESG internal control quality.

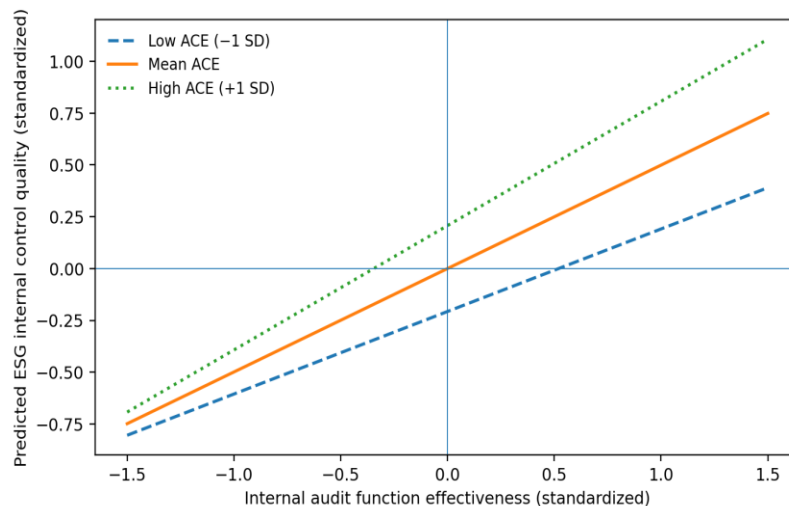


Fig. 2 Moderating Effect of Audit Committee Effectiveness on the IAF Effectiveness–ESG Internal Control Relationship

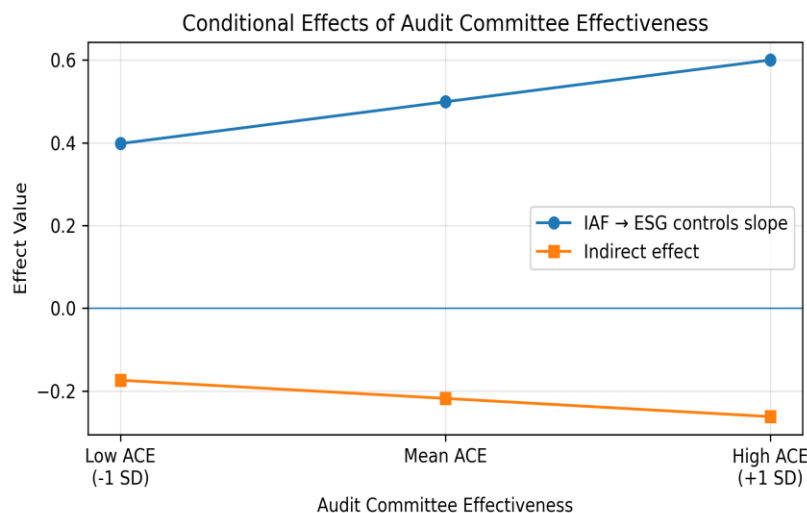


Fig. 3 Conditional Effects of Audit Committee Effectiveness on IAF Influence and Greenwashing Risk Reduction

Fig. 3 representation of conditional effects of audit committee effectiveness on the IAF-ESG control relationship and the indirect effect on greenwashing risk is given in the figure below. It can be seen that higher audit committee effectiveness enhances the IAF-ESG control relationship and also increases the indirect negative effect on greenwashing risk.

4.4 Diagnostic and Robustness Checks

Multicollinearity is not a problem in the estimated equations. VIFs for the first-stage model are between 1.01 and 1.28; VIFs for the greenwashing-risk equation are between 1.01 and 1.94. The first unrotated factor explains 39.6% of variance among items. The full collinearity VIFs for the focal construct scores are between 1.24 and 2.12. These statistics do not preclude common method variance, but neither do they suggest that a single common factor underlies the covariances.

An alternate equation for greenwashing risk includes an interaction effect between the IAF and audit committee, but without omitting the mediating variable (ESG internal control quality). This interaction effect is not statistically significant ($\beta = -.022$, $p = .569$). The interaction effect is also not statistically significant when included in the total effect model without the mediation ($\beta = -.065$, $p = .098$). These results further identify the location of the moderation: it seems to be more likely that the interaction is occurring because the audit committee makes the link between IAF and ESG internal control quality than because it makes the link between IAF and greenwashing risk.

4.5 Ethical Considerations

The research adopts organizational data based on respondents and achieves quality assurance of data through rigorous assessment for construct validity and reliability. The measurement of construct reliability was conducted using Cronbach's alpha and composite reliability, whereas the assessment of convergent and discriminant validity was performed using AVE, factor loadings, and HTMT.

V. DISCUSSION

The results of the study have shown that internal audit efficacy is a factor in reducing greenwashing risks due to the enhancement of ESG internal controls. Thus, this study proves that effective internal auditing improves the process of ESG controls, and more effective controls reduce the probability of unfounded claims on environmental performance. Additionally, it is necessary to emphasize that the effectiveness of the audit committee increases the effect of this relationship through governance mechanisms. From the theoretical perspective, the results of the study are significant for the theory in the sense that ESG internal controls become one of the mediators between the efficiency of internal audits and the credibility of sustainability reporting. Practically, the study shows that firms should pay attention to ESG data ownership, verification procedures,

audit trails, and corrective measures for improvement of the reliability of reporting.

There are several limitations of the study. First of all, the cross-sectional nature of the research does not allow for stating anything about the presence of causality between variables. In addition to this, all constructs under investigation were taken from one source, which could be a reason for the appearance of common method variance even in spite of statistical diagnostics. Moreover, greenwashing risks were assessed through perceptions of respondents concerning reporting risks rather than objective criteria such as regulatory actions, fines, etc. Lastly, there is no country-level data in the sample.

The results offer some practical applications in that they indicate the significance of improving internal audit, ESG control systems, and audit committee oversight in organizations. It is important to improve the governance of ESG data, the data verification process, documentation, and correction measures. There is a need to foster collaboration between internal auditors and the audit committees.

VI. CONCLUSION

The current paper provides evidence that the effectiveness of the IAF contributes to mitigating greenwashing risk via improving the quality of ESG internal controls and enhancing the credibility of sustainability reporting. As it is shown above, the IAF effectiveness positively affects ESG internal controls ($\beta = 0.499$, $p < 0.001$). These results indicate that high-quality internal audits lead to better ESG data ownership, validation, documentation, and remedy practices. At the same time, the quality of ESG internal controls negatively relates to the greenwashing risk ($\beta = -0.437$, $p < 0.001$). Therefore, effective control practices minimize the risk of making unsubstantiated environmental claims. Moreover, the direct association between IAF effectiveness and the risk of greenwashing is highly significant ($\beta = -0.111$, $p = 0.036$). The results obtained from the mediation analysis confirm the hypothesis of partial mediation, where IAF effectiveness has a significant indirect influence on the risk of greenwashing through ESG internal controls ($\beta = -0.218$, 95% CI $[-0.286, -0.156]$). Finally, the effectiveness of the audit committee positively moderates the effect of IAF effectiveness on ESG internal controls ($\beta = 0.101$, $p = 0.007$).

The paper adds value to sustainability governance research as it reveals ESG internal controls as a mediating mechanism explaining how IAF effectiveness affects greenwashing risk. From the practical point of view, companies need to improve their internal audit functions, ESG control systems, and audit committee oversight to increase the credibility of sustainability information. For further research, one can use a longitudinal design, multi-source data, objective greenwashing metrics, and compare samples from different countries. It would be interesting to explore additional factors of corporate governance, including sustainability

committees, digital ESG reporting systems, and external assurance practices.

REFERENCES

- [1] Abbott, L. J., Parker, S., & Peters, G. F. (2010). Serving two masters: The association between audit committee internal audit oversight and internal audit activities. *Accounting horizons*, 24(1), 1-24. <https://doi.org/10.2308/acch.2010.24.1.1>
- [2] Al-Shaer, H., & Zaman, M. (2018). Credibility of sustainability reports: The contribution of audit committees. *Business strategy and the environment*, 27(7), 973-986. <https://doi.org/10.1002/bse.2046>
- [3] Arif, M., Sajjad, A., Farooq, S., Abrar, M., & Joyo, A. S. (2021). The impact of audit committee attributes on the quality and quantity of environmental, social and governance (ESG) disclosures. *Corporate Governance: The International Journal of Business in Society*, 21(3), 497-514. <https://doi.org/10.1108/CG-06-2020-0243>
- [4] Bakarich, K. M., Baranek, D., & O'Brien, P. E. (2023). The current state and future implications of environmental, social, and governance assurance. *Current Issues in Auditing*, 17(1), A1-A21. <https://doi.org/10.2308/CIIA-2022-012>
- [5] Bamahros, H. M., Alquhaif, A., Qasem, A., Wan-Hussin, W. N., Thomran, M., Al-Duais, S. D., ... & Khojally, H. M. (2022). Corporate governance mechanisms and ESG reporting: Evidence from the Saudi Stock Market. *Sustainability*, 14(10), 6202. <https://doi.org/10.3390/su14106202>
- [6] Bernini, F., & La Rosa, F. (2024). Research in the greenwashing field: concepts, theories, and potential impacts on economic and social value: F. Bernini and FL Rosa. *Journal of Management and Governance*, 28(2), 405-444. <https://doi.org/10.1007/s10997-023-09686-5>
- [7] Bonrath, A., Eulerich, M., & Lopez-Kasper, V. (2022). Internal auditor's role in ESG disclosure and assurance: an analysis of practical insights. *Corporate Ownership & Control*, 20(1). <https://dx.doi.org/10.2139/ssrn.4070755>
- [8] Calvin, C. G. (2021). Adherence to the internal audit core principles and threats to internal audit function effectiveness. *Auditing: A Journal of Practice & Theory*, 40(4), 79-98. <https://doi.org/10.2308/AJPT-19-072>
- [9] DeSimone, S., D'Onza, G., & Sarens, G. (2021). Correlates of internal audit function involvement in sustainability audits. *Journal of Management and Governance*, 25(2), 561-591. <https://doi.org/10.1007/s10997-020-09511-3>
- [10] D'onza, G., Sarens, G., & DeSimone, S. (2020). Factors that influence the internal audit function's maturity. *Accounting Horizons*, 34(4), 57-74. <https://doi.org/10.2308/HORIZONS-18-127>
- [11] Dorfleitner, G., & Utz, S. (2024). Green, green, it's green they say: a conceptual framework for measuring greenwashing on firm level. *Review of Managerial Science*, 18(12), 3463-3486. <https://doi.org/10.1007/s11846-023-00718-w>
- [12] Frendy, Oshika, T., & Koike, M. (2024). Environmental greenwashing in Japan: the roles of corporate governance and assurance. *Meditari Accountancy Research*, 32(7), 266-295. <https://doi.org/10.1108/MEDAR-11-2023-2216>
- [13] Harasheh, M., & Provasi, R. (2023). A need for assurance: Do internal control systems integrate environmental, social, and governance factors?. *Corporate Social Responsibility and Environmental Management*, 30(1), 384-401. <https://doi.org/10.1002/csr.2361>
- [14] Hecimovic, A., & Canestrari-Soh, D. (2025). Strategies for internal auditors to expand their role in ESG assurance. *The British Accounting Review*, 101805. <https://doi.org/10.1016/j.bar.2025.101805>
- [15] Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the academy of marketing science*, 43(1), 115-135. <https://doi.org/10.1007/s11747-014-0403-8>
- [16] Moodaley, W., & Telukdarie, A. (2023). Greenwashing, sustainability reporting, and artificial intelligence: A systematic literature review. *Sustainability*, 15(2), 1481. <https://doi.org/10.3390/su15021481>
- [17] Rakipi, R., & D'Onza, G. (2024). The involvement of internal audit in environmental, social, and governance practices and risks: Stakeholders' salience and insights from audit committees and chief executive officers. *International Journal of Auditing*, 28(3), 522-535. <https://doi.org/10.1111/ijau.12341>
- [18] Szabo, S., & Webster, J. (2021). Perceived greenwashing: The effects of green marketing on environmental and product perceptions. *Journal of business ethics*, 171(4), 719-739. <https://doi.org/10.1007/s10551-020-04461-0>
- [19] Tan, D., Bilal, Gao, S., & Komal, B. (2020). Impact of carbon emission trading system participation and level of internal control on quality of carbon emission disclosures: Insights from Chinese state-owned electricity companies. *Sustainability*, 12(5), 1788. <https://doi.org/10.3390/su12051788>
- [20] Tao, L., Wei, X., & Wang, W. (2023). Does enterprise internal control improve environmental performance—empirical evidence from China. *Sustainability*, 15(13), 10199. <https://doi.org/10.3390/su151310199>