JURNAL AR RO'IS MANDALIKA (ARMADA)
Journal website: https://ojs.cahayamandalika.com/index.php/armada

ISSN: 2774-8499 Vol. 6 No. 2 (2026)

Research Article

The Role of the Assurance Dimension of Sustainability Reporting on Greenwashing: Systematic Literature Review

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Abstract

The practice of sustainability assurance has rapidly expanded in response to growing demands for transparency and accountability in environmental, social, and governance (ESG) domains. However, the effectiveness of assurance in mitigating greenwashing remains debated. This study systematically reviews recent empirical findings on the influence of four assurance dimensions—existence, provider, level, and scope—on greenwashing. A Systematic Literature Review (SLR) approach guided by PRISMA was applied to 20 peer-reviewed articles published between 2020 and 2025 across various countries and industry sectors. The synthesis reveals that assurance enhances stakeholder trust, promotes transparency, and improves market perceptions of corporate responsibility and governance when implemented under high-quality conditions. Nevertheless, its effectiveness largely depends on the independence of the assurance provider, the level of assurance obtained, and the comprehensiveness of the report's scope. Limited assurance or that conducted by non-accounting providers tends to be symbolic, whereas comprehensive assurance with broader coverage is more substantive in reducing the gap between disclosure and actual sustainability performance. This study highlights the importance of improving assurance quality and harmonizing assurance practices as a governance mechanism to mitigate the risk of greenwashing in sustainability reporting, contributing to the growing discourse on credibility and legitimacy in ESG disclosure.

Keywords: sustainability assurance; credibility; transparency; greenwashing; ESG; systematic literature review

INTRODUCTION

Sustainability reporting has become a key instrument for building legitimacy and public trust in the economic, social, and environmental (ESG) performance of companies. The increasing volume of sustainability reports, however, has not been accompanied by improved reliability and transparency of the information presented. This phenomenon has raised concerns about greenwashing practices, which involve a gap between sustainability claims (talk) and actual performance (walk) of companies (Braam et al., 2025; Willems, 2025). This inconsistency has the potential to undermine the credibility of the reports and mislead stakeholders' decision-making processes.

To strengthen the credibility of their reports, many companies have adopted sustainability assurance, which is an independent verification process of sustainability reports conducted by third parties. Assurance aims to ensure that ESG information has been prepared according to reporting standards and is trustworthy for stakeholders (Li et al., 2025; Obeng et al., 2025). Through this mechanism, companies strive to reduce information asymmetry and enhance public accountability. However, the effectiveness of assurance in reducing symbolic disclosures and improving substantive accountability remains a subject of debate (Braam et al., 2025; Krasodomska et al., 2025).

Various studies have identified that the effectiveness of assurance is highly influenced by four key dimensions: (1) the existence of assurance, (2) the provider of assurance, (3) the level of assurance, and (4) the scope of the assurance (Braam et al., 2025). *Assurance conducted by independent providers with a high level of confidence (reasonable assurance) and a broad scope (full scope) is considered more substantive, as it enhances the credibility of the report and mitigates the risk of greenwashing. In contrast, limited assurance* or *assurance performed by non-accountant providers tends to be symbolic and serves merely to maintain a false legitimacy.*

Recent studies support the role of assurance dimensions in mitigating greenwashing/decoupling. Velte shows that carbon assurance with a broad scope reduces the talk–walk gap in carbon emissions, while Obeng et al. assert that the level of assurance moderates the relationship between the quality of assurance and credibility perception. Braam et al. also prove that a combination of reasonable assurance, reputable providers, and broad scope can reduce CSR decoupling. On the other hand, studies like those by (Alkhataybeh et al., 2025; Krasodomska et al., 2025), find that most companies in emerging markets still use assurance as a formality for symbolic purposes.

Meanwhile, in developing countries, assurance practices are still limited and lack consistent quality standards. In Indonesia, sustainability reporting regulations are governed by POJK No. 51/POJK.03/2017 (Keuangan, n.d.-a, n.d.-b) on Sustainable Finance, which mandates financial services institutions and issuers to submit periodic sustainability reports. However, the implementation of assurance in Indonesia remains voluntary and lacks consistent quality standards. Local studies Meiden et al., and Razak et al., show that most assurance statements in Indonesia are general, do not explain the scope or level of assurance, and have not fully adhered to international standards such as ISAE 3000 or AA1000AS. This condition suggests that the role of assurance as a governance mechanism is still in its early stages and requires strengthening in terms of quality.

The above phenomenon indicates a research gap concerning the effectiveness of assurance dimensions in preventing greenwashing. Most previous literature has only focused on the adoption of assurance or the characteristics of providers without examining the direct link between the combination of assurance dimensions and the risk of greenwashing (S. S. Rao et al., 2025; Willems, 2025). Moreover, research in developing countries remains limited and tends to be descriptive in nature.

Based on this gap, the aim of this study is to systematically review the latest empirical findings regarding the role of the four assurance dimensions (existence, provider, level, scope) in enhancing the credibility of sustainability reports and preventing greenwashing. The Systematic Literature Review (SLR) approach is used to identify patterns, methodological trends, dominant theories, and future research directions related to the topic of assurance and sustainability reporting credibility.

METHODS

Research Stages

This study uses the Systematic Literature Review (SLR) approach, referencing Kitchenham's guidelines and the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) framework. The SLR process is carried out through three main stages: planning, conducting, and reporting the results, as explained below:

1. Planning the Review

This stage aims to outline the direction and design of the research. The activities carried out include:

a. Identification of the Research Problem

The main focus is to analyze the role of the assurance dimensions (existence, level, provider, scope) in relation to greenwashing.

b. Research Questions

- What is the impact of each assurance dimension on credibility and greenwashing?

- What are the trends in theory, methodology, and empirical findings in sustainability assurance studies from 2020 to 2025?

2. Conducting the Review

This stage involves obtaining, selecting, and processing literature relevant to the research focus. The process follows the 2020 PRISMA workflow, which includes the stages of identification, screening, eligibility, and inclusion.

a. Determination of the Search Strategy

Literature searches are conducted in the Scopus and Google Scholar databases, covering publications from 2020 to 2025, using the following keywords:

"sustainability assurance" OR "ESG assurance" OR "sustainability report" OR "assurance quality" OR "assurance provider" OR “assurance” OR "AA1000AS" OR "ISAE3000") AND "greenwashing" OR "decoupling".

Search criteria are applied to Scopus (no specific year period) and Google Scholar (2025).

b. Article Selection (*PRISMA Flow*)

Articles are searched in two main databases:

1. Scopus

Keywords are entered in the search box without additional year settings, and 15 articles are downloaded. Due to database limitations, the author is allowed to download a maximum of 15 articles.

2. Google scholar

Keywords are entered and the year range is set to 2025, resulting in 109 journal links. After attempting to download them one by one, 57 links were accessible, while the rest required payment access.

After searching both databases, 72 articles were identified, which were exported to Zotero for deduplication and metadata management. After cleaning the data, 56 unique articles remained because one article was a duplicate, five were theses, and ten articles had unreadable metadata in Zotero (three in non-English languages, three reports, and four journals). The author then entered the data of the researchers, year, title, and abstract for the 56 articles into Microsoft Excel, where the presence of thematic keywords was evaluated based on the abstract using the following formula:

$$= if(countif(tabel_{abstrac}; \text{"*kata kunci*"}; 1;0)$$

Keywords:

“level”, “provider”, “assurance”, “greenwash”, “scope”, “assurance”, “greenwash”, “decoupling”, “limited”, “reasonable”, “PAF”, “accounting firm”, “Big”.

A point scale of 0–7 was assigned, where 0 means no keyword detected in the abstract, and 1–7 indicates the presence of keywords. Articles with scores ≥ 3 were considered relevant and moved to the analysis stage. As a result, 20 articles met the inclusion criteria and were used in the thematic synthesis process (state of the art).

Summary Table of Article Selection Results:

Table 1. Summary of Article Selection Process Based on PRISMA Stages

No	PRISMA Stage	Process Performed	Number (n)	Description
1	Identification	Article search through Scopus (15) and Google Scholar (57)	72	Initial articles before deduplication
2	Screening	Removal of duplicates and irrelevant articles by title/abstract	56	10 articles with unreadable metadata, 1 duplicate, 5 theses
3	Eligibility	Assessment of eligibility using thematic keyword scoring (Excel formula)	56	Articles fully selected based on abstract and assurance–greenwashing topics
4	Inclusion	Articles with a score ≥ 3 included in the analysis synthesis	20	Used in state of the art and thematic discussion

c. Inclusion and Exclusion Criteria

To ensure that the article selection process is carried out systematically and transparently, the following inclusion and exclusion criteria were applied:

Table 2. Inclusion and Exclusion Criteria for Article Selection

Inclusion Criteria	Exclusion Criteria
Peer-reviewed articles published between 2020–2025.	Non-scientific articles such as theses, conference proceedings, institutional reports, and editorials.
Articles that use at least 3 relevant key terms related to the topic of assurance and greenwashing, such as: level, provider, assurance, greenwashing, scope, decoupling, limited, reasonable, accounting firm, and Big4.	Articles that do not contain these keywords in the title or abstract.
Articles discussing the relationship between assurance, credibility, greenwashing, or the quality of ESG reporting.	Articles that discuss general CSR or sustainability topics without a link to assurance.
Articles written in English or Indonesian.	Articles in other languages without translation.

Selection was carried out using a keyword-based semi-automated screening approach, where each article was evaluated based on the appearance of at least three key terms (≥3 out of 10) in the title and abstract. Articles with a score of ≥3 were considered to meet the inclusion criteria, while those with a score of <3 were excluded.

This process was assisted by AI-based text analysis to speed up the detection of keywords, which was then manually verified to ensure contextual relevance to the topic of assurance and greenwashing, thus avoiding false positives and false negatives (Grames et al., 2019).

A total of 72 articles were identified at the initial stage, then 56 articles were retained after duplicates were removed, and finally, 20 articles met the inclusion criteria and were used in the thematic synthesis stage.

All articles that met the inclusion criteria were then analyzed thematically to identify patterns in the relationships between assurance dimensions, the theories used, and the direction of their impact on greenwashing, as explained in the reporting stage below.

d. Data Extraction and Coding

This stage is the core process of the SLR, where each selected article is systematically summarized into a data extraction matrix. The extraction process focuses on the following elements:

Table 3. Data Extraction Elements for Thematic Synthesis of Assurance and Greenwashing Studies

Element	Description
No	Article number in the final list (1–20).
Author & Year	Researcher names and the publication year of the journal, used for source identification (e.g., Willems, 2025).
Title	Full title of the article that indicates the focus on sustainability assurance and greenwashing.
Location	The country or region where the research was conducted (e.g., Indonesia, UK, China, Australia, Multinational).
Type	The type of research based on its approach, such as quantitative empirical, descriptive, experimental study, or content analysis.
Method	Analysis technique or research design used, such as panel regression, PLS-SEM, 2×3 experiment, or content analysis.
Independent Variables	The main explanatory factors (e.g., existence of assurance, provider type, investor pressure, board characteristics).
Dependent Variables	The outcome variables measured (e.g., report credibility, greenwashing, firm value, sustainability report quality).
Theory	Theories used to explain relationships between variables, such as Legitimacy Theory, Signaling Theory, Institutional Theory, or Stakeholder Theory.
Key Findings	The core findings of each study, summarizing the direction of influence between variables, empirical contributions, and relevance to the assurance–greenwashing topic.

The extraction results from the 20 articles serve as the foundation for the thematic synthesis stage in the results and discussion section.

e. SRL Quality Indicators (Quality Assessment)

Journal quality assessment is conducted based on the Systematic Literature Review guidelines developed by (Kitchenham, 2004; Tranfield et al., 2003) and aligned with the (statement, n.d.). The assessment process uses four main indicators:

relevance, methodological rigor, scientific contribution, and data traceability. Each indicator is rated on a scale of 1-3 (1=low, 2=medium, 3=high) based on the reviewed journal. The total score (maximum 12) is used to categorize the article quality into three categories: high if the score is 10-12, medium if the score is 7-9, and low if the score is below 6.

Table 4. Quality Assessment of Articles Based on Relevance, Methodological Rigor, Scientific Contribution, and Data Traceability

No	Author & Year	Full Research Title	Relevance	Methodological Rigor	Scientific Contribution	Data Traceability	Total Score	Category
1	Braam et al. (2025)	*CSR Decoupling and Assurance of CSR Reports: Do Combinations of Level, Scope, and Assurance Provider Matter?*	3	3	3	3	**12**	High
2	Arena et al. (2025)	*ESG Rating Disagreement and Sustainability Reporting Standards and Assurance Practices*	3	3	3	3	**12**	High
3	Willems (2025)	*Sustainability Assurance and Its Influence on Greenhouse Gas Emissions: Accountability or Symbolism?*	3	3	3	3	**12**	High
4	Sánchez-Sancho et al. (2025)	*Sustainability Assurance Practice Diversity and Idiosyncratic Risk in Carbon Intensive Firms: A Textual Analysis Approach*	3	3	3	3	**12**	High
5	Obeng et al. (2025)	*Sustainability Assurance Quality and Board Gender Diversity: Moderating Role of Assurance Level and Provider Type on the Extent of Assurance Procedures*	3	3	3	2	**11**	High
6	García-Sánchez et al. (2025)	*ESG Controversies and External Assurance: Examining Their Impact on Firm Value and Image*	3	3	3	3	**12**	High
7	Xhindole & Tarquinio (2025)	*An Examination of Assurance Practices on Carbon Emission Disclosures: Evidence From Italy and Spain*	3	3	2	3	**11**	High

8	Li et al. (2025)	*Annual Report Audit, ESG Report Assurance and Audit Quality: Evidence From the Same Accounting Firm*	3	3	3	3	**12**	High
9	Emma et al. (2024)	*High-Quality Assurance, ESG Legitimacy Threats and Board Effectiveness*	3	3	3	3	**12**	High
10	Velte (2025a)	*Climate Board Governance and Carbon Assurance – European Evidence*	3	3	3	3	**12**	High
11	Krasodomska et al. (2025)	*The Impact of Companies' Trust-Building Efforts on Sustainability Reporting Assurance Quality: Insights From Europe*	3	3	3	3	**12**	High
12	Liu et al. (2025)	*Choice of Financial Audit Firm and ESG Assurance Firm: The Role of Board of Director Characteristics*	3	3	3	3	**12**	High
13	Sakchuenyos et al. (2025)	*The Impacts of Disclosing Internal Controls, Board Oversight and Assurance by Different Types of External Assurers on Investors' Use of Sustainability Information*	3	3	3	3	**12**	High
14	Velte (2025b)	*Determinants of the Selection of Sustainability Assurance Providers and Consequences for Firm Value: A Review of Empirical Research*	3	2	3	3	**11**	High
15	Razak et al. (2022)	*Analisis Isi atas Kualitas Assurance Statement pada Sustainability Report Emiten Terindeks SRI-KEHATI Periode 2017–2021*	3	2	2	2	**9**	Medium

16	Alkhataybeh et al. (2025)	*Sustainability Reporting and External Assurance: Evidence From UK Listed Firms*	3	2	2	2	**9**	Medium
17	Kühle & Quick (2025)	*The Impact of Corporate Governance Statement Assurance on Financial Professionals' Decisions*	3	2	2	2	**9**	Medium
18	Gipper et al. (2025)	*ESG Assurance in the United States*	3	2	2	2	**9**	Medium
19	S. Rao et al. (2025)	*Textual Analysis of Sustainability Reports: Topics, Firm Value, and the Moderating Role of Assurance*	3	2	2	2	**9**	Medium
20	S. S. Rao et al. (2025)	*Voluntary Audits of Nonfinancial Disclosure and Earnings Quality*	3	2	2	2	**9**	Medium

Quality Assessment Recap

Table 5. Quality Assessment Summary of Selected Articles

No	Quality Category	Number of Articles	Percentage
1	High Quality (10–12)	14	70%
2	Medium Quality (7–9)	6	30%
3	Low Quality (≤6)	0	0%

Overall Average Scores

Table 6. Average Scores and Interpretation of Quality Indicators

No	Indicator	Average Score	Interpretation
1	Relevance	3	All studies focus on the assurance–greenwashing topic
2	Methodological Rigor	2.65	Most use strong empirical methods (panel, SEM, experiments, text mining)
3	Scientific Contribution	2.65	Provides new models, moderators, or variables related to assurance and legitimacy
4	Data Traceability	2.65	Sample information and research period are clear and complete

Based on the recap and overall average scores, it shows that dimension (3) received high ratings, meaning all articles have relevant themes and clear methodological reporting. Meanwhile, methodological rigor (2.65), scientific contribution (2.65), and data traceability (2.65) indicate variation in the depth of analysis and the novelty of findings across studies. Overall, the total score of 10.95 out of 12 indicates that the literature used is of high quality and relevant for further thematic synthesis.

With the above quality assessment results, 20 journals are suitable for further analysis.

Reporting the Review Stage

The reporting stage is the final phase in the Systematic Literature Review (SLR) method, which focuses on presenting the data synthesis results transparently and in a structured manner. Reporting includes two main components:

1. Presentation of the extracted data (state of the art) that highlights the core information from each prior study.
2. Thematic analysis and research trends discussing the relationships between variables, dominant theories, methodologies used, and developments in the topics of assurance and greenwashing.

RESULT AND DISSCUSSION

Tabel state of the art

Table 7. Summary of Key Findings from Research on Sustainability Assurance and Greenwashing

No	Author & Year	Full Research Title	Location/Sample	Method	Independent Variables	Dependent Variables	Theory	Key Findings
1	(Braam et al., 2025)	CSR Decoupling and Assurance of CSR Reports: Do Combinations of Level, Scope, and Assurance Provider Matter?	Western Europe	Panel Regression	Assurance provider, level, scope	CSR Decoupling Index	Legitimacy, Signaling	A combination of reasonable assurance, full scope, and reputable provider (Big-4) reduces the gap between CSR disclosure and actual performance; limited assurance increases decoupling.
2	(Arena et al., 2025)	ESG Rating Disagreement and Sustainability Reporting Standards and Assurance Practices	Europe	Panel Regression	Assurance existence, level, provider	ESG Rating Disagreement	Legitimacy, Signaling	High-level assurance and accounting providers reduce ESG rating disagreement across rating agencies; limited assurance is insignificant.
3	(Willems, 2025)	Sustainability Assurance and Its Influence on Greenhouse Gas Emissions: Accountability or Symbolism?	38 Countries (2017–2023)	Panel Regression	Assurance level, scope, provider	GHG Emission Intensity	Legitimacy, Signaling	A combination of reasonable assurance and full scope reduces carbon emission intensity and enhances substantive accountability; limited assurance is symbolic.

No	Author & Year	Full Research Title	Location/Sample	Method	Independent Variables	Dependent Variables	Theory	Key Findings
4	(Sánchez-Sancho et al., 2025)	Sustainability Assurance Practice Diversity and Idiosyncratic Risk in Carbon-Intensive Firms: A Textual Analysis Approach	Europe (carbon-intensive companies)	Textual Analysis (NLP)	Assurance professionalism index (materials, reliability, accuracy)	Idiosyncratic Risk	Legitimacy, Agency	High assurance professionalism reduces reputation risk and increases credibility; shallow assurance practices indicate symbolic greenwashing.
5	(Obeng et al., 2025)	Sustainability Assurance Quality and Board Gender Diversity: Moderating Role of Assurance Level and Provider Type on the Extent of Assurance Procedures	Global Fortune 500	OLS + 2SLS Moderation	Board gender diversity × assurance level × provider	Assurance Quality	Legitimacy, Signaling	Gender diversity strengthens the influence of independent providers and reasonable assurance on assurance quality; limited assurance remains symbolic.
6	(García-Sánchez et al., 2025)	ESG Controversies and External Assurance: Examining Their Impact on Firm Value and Image	Europe (530 firms)	Panel Regression	Provider, Scope	Firm Value, ESG Reputation	Legitimacy	Reputable providers and full scope reduce the negative impact of ESG controversies on firm value and reputation.
7	(Xhindole & Tarquinio, 2025)	An Examination of Assurance Practices on Carbon Emission Disclosures: Evidence From Italy and Spain	Italy & Spain (FTSE MIB & IBEX 35)	Content Analysis	Assurance existence, provider, level	Carbon Disclosure Credibility	Legitimacy, Signaling	Only firms with full assurance by accountants show substantive transparency on carbon emissions; most assurance practices are symbolic for social legitimacy.

No	Author & Year	Full Research Title	Location/Sample	Method	Independent Variables	Dependent Variables	Theory	Key Findings
8	(Razak et al., 2022)	Content Analysis of Assurance Statement Quality in Sustainability Reports of SRI-KEHATI Listed Companies (2017–2021)	Indonesia (23 companies)	Content Analysis	Assurance provider, level, scope	Assurance Statement Quality, Greenwashing Indicators	Legitimacy, Signaling	Most assurance statements from IDX-listed companies are symbolic due to narrow scope and limited assurance; only independent providers with full scope show substantive assurance with low greenwashing indicators.
9	(Li et al., 2025)	Annual Report Audit, ESG Report Assurance, and Audit Quality: Evidence From the Same Accounting Firm	China	Panel Regression	Audit–assurance overlap (provider)	Audit Quality (discretionary accruals)	Signaling	Using the same provider for audit and ESG assurance enhances audit quality and reporting integrity; significant effect on reasonable assurance.
10	(García Meca et al., 2024)	High-Quality Assurance, ESG Legitimacy Threats, and Board Effectiveness	Europe	SEM–PLS	Assurance Quality	ESG Legitimacy Threat	Legitimacy	High-quality assurance strengthens board effectiveness in addressing ESG legitimacy threats and reduces symbolic disclosures.
11	(S. Rao et al., 2025)	Textual Analysis of Sustainability Reports: Topics, Firm Value, and the Moderating Role of Assurance	Global	Text Mining + Regression	Assurance existence, scope	Firm Value, Disclosure Consistency	Legitimacy	Assurance reduces the talk–walk gap and improves disclosure consistency; greenwashing indicators decrease.

No	Author & Year	Full Research Title	Location/Sample	Method	Independent Variables	Dependent Variables	Theory	Key Findings
12	(Velte, 2025a)	Climate Board Governance and Carbon Assurance – European Evidence	EU	Panel Regression	Board governance, assurance scope	Carbon Transparency Index	Legitimacy	Full assurance scope enhances carbon transparency and supports good climate governance.
13	(Velte, 2025b)	Determinants of the Selection of Sustainability Assurance Providers and Consequences for Firm Value: A Review of Empirical Research	Germany	Logit + OLS	Provider Reputation (Big-4 vs Non-Big-4)	Firm Value	Legitimacy, Institutional	Reputable providers (Big-4) enhance firm value and market legitimacy; low-quality assurance is insignificant.
14	(Alkhataybeh et al., 2025)	Sustainability Reporting and External Assurance: Evidence From UK Listed Firms	UK	Panel Regression	Provider, Level	Reporting Credibility	Legitimacy, Institutional	Independent providers and reasonable assurance enhance sustainability report credibility; limited assurance is insignificant.
15	(Kühle & Quick, 2025)	The Impact of Corporate Governance Statement Assurance on Financial Professionals' Decisions	Germany	Experiment	Presence of Governance Statement Assurance	Investor Judgement	Signaling	Assurance on governance statements improves perceptions of report credibility; although not sustainability report assurance, results support the legitimacy function of assurance.

No	Author & Year	Full Research Title	Location/Sample	Method	Independent Variables	Dependent Variables	Theory	Key Findings
16	(Krasodomska et al., 2025)	The Impact of Companies' Trust-Building Efforts on Sustainability Reporting Assurance Quality: Insights From Europe	Eastern Europe	Mixed Methods	Trust-Building Activities	Assurance Quality	Institutional	Companies' trust-building efforts improve stakeholders' perceptions of assurance quality; significant effects on stakeholder-oriented firms.
17	(Liu et al., 2024)	Choice of Financial Audit Firm and ESG Assurance Firm: The Role of Board of Director Characteristics	China	Panel Regression	Board Characteristics, Audit–Assurance Choice	ESG Assurance Selection	Institutional	Board characteristics and auditor reputation influence the choice of ESG assurance providers; independent boards tend to choose highly reputable providers.
18	(Sakchuenyos et al., 2025)	The Impacts of Disclosing Internal Controls, Board Oversight, and Assurance by Different Types of External Assurers on Investors' Use of Sustainability Information	Thailand	SEM + Regression	Board Oversight, Provider Type	ESG Credibility	Signaling, Governance	Board oversight strengthens the effect of assurance by accountants on ESG disclosure credibility; non-accountant providers are more symbolic.
19	(Gipper et al., 2025)	ESG Assurance in the United States	United States	Empirical Descriptive	Provider, Scope	ESG Assurance Adoption	Institutional	Big-4 dominate the assurance market in the US; provider independence and scope influence report credibility.

No	Author & Year	Full Research Title	Location/Sample	Method	Independent Variables	Dependent Variables	Theory	Key Findings
20	(S. S. Rao et al., 2025)	Voluntary Audits of Nonfinancial Disclosure and Earnings Quality	Global	Panel Regression	Assurance Existence	Earnings Quality	Signaling	Voluntary assurance on non-financial disclosures enhances earnings quality and reporting credibility; supports substantive legitimacy function.

Based on the table above, variations in the results regarding the effectiveness of sustainability report assurance in reducing greenwashing practices can be observed. The thematic analysis and research trends are presented in the following subsections.

a. Thematic Analysis of the Review Results

Based on the extraction results of 20 articles in Table 7, four main themes representing the dimensions of sustainability assurance and their relationship with greenwashing can be identified. Each dimension presents different findings according to the context, methods, and theoretical frameworks used by previous researchers.

1) Existence Dimension (Presence of Assurance)

The existence of assurance functions as an initial signal of the company's commitment to gaining legitimacy. Cross-country studies (Braam et al., 2025; S. Rao et al., 2025; Willems, 2025) show that companies with assurance tend to have higher-quality and consistent reports in terms of disclosures. In developing countries like Indonesia, the existence of assurance remains largely formal (Aprianto et al., 2022; Meiden et al., 2024). This suggests that assurance is only effective in reducing greenwashing when accompanied by adequate quality and independence in the process.

2) Provider Dimension (Assurance Provider)

The choice of the assurance provider determines the quality of the report. Studies Liu et al., and Velte found that providers with a high reputation (Big-4) or public accountants enhance stakeholder trust and reduce ESG rating discrepancies. On the other hand, non-accounting providers or those who also serve as financial auditors risk compromising independence (Li et al., 2025; Sakchuenyos et al., 2025).

3) Level Dimension (Level of Assurance)

The difference between limited and reasonable assurance determines the depth of verification conducted by the provider. Braam et al., Obeng et al., and Willems show that reasonable assurance reduces greenwashing because it involves deeper evidence. However, most global companies still choose limited assurance for cost reasons (Li et al., 2025). High assurance levels reflect a substantive commitment to transparency and accountability in reporting.

4) Scope Dimension (Assurance Scope)

The scope of assurance indicates the extent of the report verified by the provider. Studies García-Sánchez et al., Willems, and Xhindole & Tarquinio found that full assurance reduces the talk-walk gap and increases report accountability, while partial assurance tends to be symbolic. In Indonesia, the scope is still narrow due to the lack of regulatory obligations related to sustainability report assurance.

Research Trends

Table 8. Research Trends and Developments in Sustainability Assurance and Greenwashing

No	Theme	Global Trends	Developments 2020–2025	Notes on the Indonesian Context
1	Research Methods	Panel regression and content/text analysis	Emergence of experiments and mixed methods	Indonesian studies still predominantly descriptive
2	Dominant Theories	Legitimacy, Signaling, Institutional	Increasing use of multi-theory integration	Signaling and Institutional theories are still rarely applied in Indonesia
3	Popular Variables	Provider, Level, Scope	Emergence of governance & gender diversity variables	The PROPER variable has not been widely tested
4	Study Areas	Focus on Europe & China	Expanding to Southeast Asia	Indonesia is still in the early stages of assurance application
5	Result Direction	Assurance reduces greenwashing when substantive	Symbolic assurance still prevalent in emerging markets	Need for integration with AA1000AS and ISAE 3000 (Revised) standards

Theory Integration

The SLR results confirm three main theories underlying companies' implementation of assurance on non-financial reports:

1. Legitimacy Theory
2. Signaling Theory
3. Institutional Theory

These theories explain how assurance functions substantively or symbolically depending on the context and the quality of its implementation.

Research Gap

Several research gaps identified include:

a. Few studies examine the direct relationship between assurance dimensions and greenwashing index (talk-walk gap);

b. Variation in assurance quality across countries. Cross-country studies show significant differences in report quality. Research in Europe and the US demonstrates substantial effects on accountability, while in developing countries, assurance is often symbolic. This gap opens the door for exploring institutional factors and cross-jurisdictional governance;

c. Lack of theory integration. Most studies rely on a single theoretical framework (legitimacy or signaling). Future studies should incorporate institutional theory to capture the dynamics of the relationship between assurance and greenwashing.

CONCLUSION

The study synthesizes empirical research findings on the role of sustainability report assurance dimensions in mitigating greenwashing, using the systematic literature review (SLR) approach based on the PRISMA 2020 guidelines. From the 20 articles analyzed, the majority indicate that assurance functions as a mechanism to improve the quality of sustainability reports. It helps bridge the gap between disclosures (talk) and actual performance (walk), thereby enhancing report credibility. The four assurance dimensions—existence, level, provider, and scope—show varying effects on greenwashing. A combination of reputable providers, reasonable assurance, and a full scope of assurance has been shown to reduce the tendency for symbolic disclosures, thereby increasing report accountability. On the other hand, limited assurance conducted by non-accounting providers tends to be more symbolic and less effective in preventing greenwashing.

The results of the SLR further reveal that legitimacy, signaling, and institutional theories are the dominant frameworks used to explain the motivations and implications of assurance implementation. These theories complement each other: legitimacy theory highlights the need for organizations to maintain their public image, signaling theory explains assurance's role in conveying credibility to stakeholders, and institutional theory emphasizes the influence of normative pressures on the existence of high-quality assurance.

The synthesis results suggest that assurance practices play two roles: a substantive role, improving the quality of reports and reducing information asymmetry, and a symbolic role, acting as a tool for reputation legitimacy without causing any real change in sustainable performance.

Regarding research implications, this study reinforces the understanding that the effectiveness of assurance is determined not only by its existence but also by the combination of quality dimensions, such as the provider, level, and scope. These findings open the door for the development of new theoretical models that integrate legitimacy and signaling theories within the context of greenwashing mitigation. Empirically, there is a need for more studies directly measuring greenwashing, and future research should focus on developing quantitative indicators, such as the talk-walk gap or CSR decoupling index. Practically, the results underline the importance of selecting independent, reputable assurance providers and implementing reasonable assurance with a full scope to achieve substantive legitimacy. High-quality assurance, as assessed by the provider, level of assurance, and scope, is more effective in preventing greenwashing than merely having assurance in place. Strengthening the quality of assurance is therefore key to enhancing the credibility of sustainability reports and building stakeholder trust in a company's commitment to sustainability.

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