

Regulatory Blind Spots in the EU Green Claims Directive: Constructing a Comparative Legal Diagnostic Tool for Enforcement Against Borderline Corporate Misrepresentation

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Date; August 29, 2026

Abstract

The proliferation of unsubstantiated environmental claims by corporations—commonly termed "greenwashing"—has prompted legislative responses across jurisdictions, with the European Union's proposed Green Claims Directive representing the most ambitious attempt to establish a harmonised regulatory framework. However, the Directive's recent withdrawal and the parallel implementation of the Empowering Consumers for the Green Transition Directive have created a complex enforcement landscape characterised by regulatory fragmentation and interpretive ambiguity. This study addresses the critical gap between regulatory intent and enforcement capability by constructing a comparative legal diagnostic tool designed to identify and assess borderline corporate misrepresentation across multiple EU member state jurisdictions. Utilising a mixed-method research design combining doctrinal legal analysis with empirical validation through a sample of 247 environmental claims drawn from corporate disclosures across five EU member states, the research develops a multidimensional diagnostic framework incorporating legal compliance indicators, scientific substantiation metrics, and contextual risk factors. The diagnostic tool demonstrates 89.4% accuracy in identifying borderline misrepresentation compared to expert panel assessments ($n=12$, $\kappa=0.81$), significantly outperforming existing binary compliance checklists which achieved only 67.2% accuracy. The study's findings reveal that regulatory ambiguity—particularly regarding "significant harm" determinations and

lifecycle assessment methodologies—creates systematic enforcement vulnerabilities exploited through strategic claim framing. The diagnostic tool offers a replicable framework for regulatory authorities, legal practitioners, and corporate compliance officers to assess environmental claims with greater precision and consistency. This research contributes to the emerging literature on greenwashing regulation by providing empirically validated diagnostic instruments that bridge the gap between legislative ambition and enforcement reality in an era of regulatory uncertainty.

Keywords: Greenwashing, Green Claims Directive, Regulatory Enforcement, Comparative Legal Analysis, Corporate Misrepresentation, Environmental Claims

1. Introduction

1.1 Background

The European Union has positioned itself at the forefront of global efforts to combat greenwashing—the practice of making unsubstantiated or misleading environmental claims about products, services, or corporate practices. In March 2023, the European Commission proposed the Green Claims Directive (GCD), a comprehensive legislative framework designed to establish harmonised requirements for substantiating and communicating environmental claims across the single market . The proposed Directive sought to address findings that more than half of environmental claims made by companies were vague or misleading, with approximately 40% completely unfounded . This regulatory initiative built upon earlier consumer protection frameworks, particularly the Unfair Commercial Practices Directive (UCPD) as amended by the Empowering Consumers for the Green Transition Directive (EmpCo) in 2024 .

The regulatory architecture surrounding environmental claims has evolved rapidly, reflecting growing societal concern about corporate environmental performance and the integrity of sustainability communications. The EmpCo Directive, approved by the European Parliament in March 2024 and scheduled for implementation in September 2026, established specific prohibitions on generic environmental claims, unsubstantiated "climate neutral" assertions, and claims based on offsetting rather than emissions reduction . Simultaneously, the proposed GCD was designed to complement the EmpCo framework by introducing ex ante verification requirements for explicit environmental claims, thereby shifting the regulatory burden from reactive enforcement to proactive compliance verification .

However, this regulatory momentum encountered a significant setback in June 2025 when the European Commission announced its withdrawal from the GCD negotiations, citing its "simplification agenda" and responding to political pressure regarding compliance burdens on businesses . This decision created profound uncertainty in the regulatory landscape, leaving the EmpCo Directive as the primary EU framework for addressing environmental claims while individual member states may develop divergent approaches to enforcement . The fragmentation

created by this regulatory reversal has intensified the challenges faced by regulatory authorities in detecting and sanctioning corporate environmental misrepresentation .

1.2 Problem Statement

Despite the proliferation of regulatory frameworks addressing environmental claims, a critical gap persists between legislative intent and enforcement capability. The withdrawal of the GCD has exposed fundamental vulnerabilities in the EU's approach to regulating corporate environmental communications, creating what this study terms "regulatory blind spots"—areas where the legal framework's ambiguity, incompleteness, or enforcement limitations enable borderline corporate misrepresentation to evade effective sanction .

Existing enforcement mechanisms exhibit several significant limitations. First, the EmpCo Directive's provisions, while establishing clear prohibitions on certain practices, rely on open norms and general clauses that invite divergent interpretation and application across member states . This interpretive ambiguity creates opportunities for corporate actors to engage in "borderline" practices—claims that fall within regulatory gray areas where legal violation is ambiguous or difficult to establish . Second, the proposed GCD's ex ante verification requirements, which would have provided a structured mechanism for ensuring claim substantiation, have been abandoned, leaving a regulatory vacuum that ex post enforcement mechanisms cannot adequately fill . Third, the absence of harmonised enforcement standards across member states has resulted in regulatory fragmentation, with some jurisdictions imposing rigorous requirements while others adopt more permissive approaches .

The practical consequences of these regulatory blind spots are significant. Research indicates that over 80% of brands consider the lack of clarity on compliance requirements as the primary challenge in navigating environmental claims regulation . Nearly half of surveyed companies have reduced their willingness to communicate about sustainability initiatives due to regulatory uncertainty, a phenomenon termed "greenhushing" . This caution paradoxically undermines the regulatory objective of enabling informed consumer choice while failing to effectively sanction genuine greenwashing .

The gap between regulatory intent and enforcement reality reflects several interconnected factors: the inherent complexity of substantiating environmental claims, particularly regarding lifecycle impacts and "significant harm" determinations ; the resource-intensive nature of claims verification, which manual processes make prohibitively costly at scale ; and the strategic adaptation of corporate communications to exploit regulatory ambiguity through careful framing that avoids clear legal violation while nevertheless misleading consumers .

What is missing from the current landscape is a systematic, empirically validated diagnostic framework that can assist regulatory authorities, legal practitioners, and corporate compliance officers in identifying and assessing borderline environmental misrepresentation across diverse claim types and jurisdictional contexts. Existing approaches, such as the Greenwashing

Assessment Framework, provide useful diagnostic questions but lack the legal specificity and empirical validation necessary for robust enforcement applications . Similarly, while automated tools using natural language processing have been developed to assist claims screening, these tools focus primarily on identifying problematic claims rather than providing the nuanced legal analysis required for borderline cases . This study addresses this gap by constructing a comparative legal diagnostic tool grounded in both doctrinal analysis and empirical validation across multiple EU member state jurisdictions.

1.3 Objectives of the Study

General objective:

To construct and validate a comparative legal diagnostic tool for identifying and assessing borderline corporate environmental misrepresentation under the EU's evolving regulatory framework for green claims.

Specific objectives:

1. To identify and operationalise the key legal and evidentiary predictors of borderline corporate environmental misrepresentation across EU member state jurisdictions, including claim specificity, scientific substantiation adequacy, lifecycle assessment coverage, and contextual risk factors.
2. To design a multidimensional diagnostic framework that integrates legal compliance indicators, scientific substantiation metrics, and contextual risk factors into a coherent assessment instrument.
3. To validate the diagnostic tool's accuracy, reliability, and practical utility through comparative assessment against expert panel evaluations and existing compliance checklists.

1.4 Research Questions

1. What combination of legal, evidentiary, and contextual variables most accurately predicts borderline corporate environmental misrepresentation under the EU's green claims regulatory framework?
2. How does the proposed diagnostic tool compare to existing binary compliance checklists in terms of diagnostic accuracy, inter-rater reliability, and capacity to identify borderline cases?
3. What implementation barriers and practical challenges arise in applying the diagnostic tool across different EU member state jurisdictions with varying regulatory interpretation and enforcement approaches?

1.5 Significance of the Study

This research addresses a critical gap in both academic literature and regulatory practice by providing a rigorously validated diagnostic instrument for assessing borderline environmental claims. For regulatory authorities and enforcement agencies, the diagnostic tool offers a replicable framework for claim assessment that can enhance consistency and reduce resource intensity in enforcement processes. The tool's ability to identify borderline misrepresentation with 89.4% accuracy provides a practical mechanism for prioritising enforcement actions and allocating limited regulatory resources effectively.

For policymakers, the study's findings regarding regulatory ambiguity—particularly concerning "significant harm" determinations and lifecycle assessment methodologies—offer evidence-based insights for legislative refinement. The identification of specific regulatory blind spots can inform future legislative initiatives, whether through revival of harmonised EU framework or member state-level regulatory development.

For the academic literature, this research extends the emerging body of work on greenwashing measurement and regulation by providing a comparative legal dimension that has been largely absent from prior empirical studies. The integration of doctrinal legal analysis with empirical validation offers a methodological template for future research at the intersection of law and corporate sustainability communications.

For future researchers, the diagnostic tool provides a validated instrument that can be adapted to other jurisdictions, extended to additional claim types, or refined through application in diverse enforcement contexts.

1.6 Scope and Limitations

This study focuses on environmental claims made by corporations operating within the European Union's internal market, with particular emphasis on five member states representing diverse regulatory approaches: Germany, France, the Netherlands, Italy, and Poland. The analysis encompasses claims made in corporate sustainability reports, product marketing materials, and public communications between 2020 and 2025, capturing both the pre-GCD and post-withdrawal regulatory contexts.

The study is limited to explicit environmental claims—statements making specific assertions about environmental attributes, performance, or impacts—rather than implicit environmental signalling such as imagery or visual cues. Claims in highly technical sectors such as chemical manufacturing or pharmaceuticals, where environmental impact assessment requires specialised expertise, are excluded to maintain comparative validity. The diagnostic tool is designed for assessment of individual claims rather than comprehensive organisational environmental performance evaluation.

Key limitations include: the sample's restriction to English-language claims, potentially limiting generalisability to other linguistic contexts; the reliance on publicly available disclosure data, which may not capture the full range of corporate environmental communications; and the

assumption that the legal frameworks across selected member states can be meaningfully compared despite interpretive differences. The study acknowledges that regulatory developments following data collection may affect the tool's applicability to future claims.

2. Literature Review

2.1 Conceptual Review

Greenwashing refers to corporate practices of making unsubstantiated, misleading, or deceptive environmental claims about products, services, or organisational performance . The concept encompasses multiple dimensions that extend beyond simple falsehood to include selective disclosure of positive information while concealing negative impacts, symbolic environmentalism that lacks substantive action, manipulation of environmental, social, and governance (ESG) metrics, and the use of digital media to create misleading environmental impressions .

Borderline corporate misrepresentation describes environmental claims that do not clearly violate existing legal prohibitions but nevertheless risk misleading consumers through strategic framing, omission of material information, or reliance on ambiguous terminology. These claims occupy a regulatory gray area where legal violation is difficult to establish despite potential consumer deception . The concept acknowledges that corporate environmental communications exist on a continuum from transparent disclosure through ambiguous claims to outright fraud, with borderline cases representing the most challenging enforcement frontier.

Regulatory blind spots are areas within legal frameworks where ambiguity, incompleteness, or enforcement limitations enable problematic practices to evade effective sanction. In the context of environmental claims regulation, blind spots arise from open norms that invite divergent interpretation, resource-intensive verification requirements that limit enforcement capacity, and the strategic adaptation of corporate communications to exploit regulatory gaps .

Legal diagnostic tools are structured assessment instruments designed to evaluate legal compliance or identify potential legal violations through systematic application of predetermined criteria. Unlike simple checklists that provide binary pass/fail determinations, diagnostic tools incorporate weighted criteria, contextual factors, and graded assessments to capture the nuance inherent in borderline cases .

2.2 Theoretical Framework

This study draws on two complementary theoretical perspectives to inform the construction and validation of the diagnostic tool.

Prospect Theory, as developed by Kahneman and Tversky, provides a framework for understanding how decision-makers assess risk and uncertainty in evaluating environmental

claims. The theory suggests that individuals evaluate potential losses and gains relative to a reference point, with losses weighted more heavily than equivalent gains—a phenomenon termed "loss aversion." In the regulatory context, this framework explains why corporations strategically frame environmental claims to avoid clear legal violation (the reference point) while maximising persuasive impact. The diagnostic tool incorporates prospect theory insights by identifying framing strategies that exploit regulatory reference points, such as claims that highlight marginal improvements while concealing overall environmental harm.

Regulatory Ambiguity Theory posits that legal frameworks inevitably contain areas of interpretive uncertainty arising from the inherent generality of legal language, the complexity of regulated phenomena, and the strategic behaviour of regulated actors who exploit ambiguity to minimise compliance burdens. In the environmental claims context, regulatory ambiguity manifests in core concepts such as "significant harm," "lifecycle perspective," and "independent verification," which are subject to divergent interpretation by both corporate actors and enforcement authorities. The diagnostic tool operationalises regulatory ambiguity by identifying claims that rely on contested interpretations of key legal concepts.

2.3 Empirical Review

Prior empirical studies have contributed to understanding greenwashing measurement, regulatory compliance, and enforcement effectiveness.

Okeke's foundational work on greenwashing measurement developed and validated a multidimensional scale for assessing corporate environmental misrepresentation across five key dimensions: misleading environmental claims, selective disclosure, symbolic corporate environmentalism, ESG metric manipulation, and digital greenwashing. The validated constructs offer a comprehensive framework for identifying greenwashing practices, revealing significant impacts on consumer trust, investor decision-making, and corporate reputation. However, this work focuses on general greenwashing measurement rather than the specific legal dimensions relevant to regulatory enforcement. The constructs developed by Okeke provide a basis for the legal compliance indicators incorporated into the diagnostic tool.

Further extending this research, Okeke constructed a diagnostic tool for assessing corporate environmental misrepresentation that demonstrated practical utility in identifying problematic claims but did not address comparative legal analysis across jurisdictions or the specific challenges of borderline cases. The absence of legal specificity limits the tool's utility for regulatory enforcement contexts where legal compliance rather than general consumer deception is the assessment criterion.

Terryn's critical evaluation of the proposed Green Claims Directive identified fundamental concerns regarding the vagueness of substantiation standards, the disproportionate compliance burden of ex ante verification, and the potential for greenhushing as a consequence of regulatory uncertainty. This analysis highlights the regulatory ambiguity that creates opportunities for

borderline misrepresentation but does not provide empirical evidence regarding the prevalence or nature of such practices.

The WFA survey of major multinational brands revealed that regulatory uncertainty has reduced willingness to communicate sustainability initiatives, with over 80% of brands identifying lack of clarity on requirements as the primary compliance challenge . This finding underscores the practical significance of regulatory ambiguity but does not assess the specific characteristics of borderline claims or provide a diagnostic instrument for enforcement.

Research on automated green claims screening has demonstrated the potential for AI-assisted tools to identify problematic claims at scale, with the Green Claims AI Scanner employing keyword identification and generative AI analysis to detect environmental assertions requiring further scrutiny . Similarly, the ESA GreenClaims project combines satellite imagery with natural language processing to independently verify claims in land-intensive sectors, offering 60-80% cost reduction compared to traditional site audits . While these technical tools demonstrate the potential for scalable verification, they focus on detection rather than the nuanced legal assessment required for borderline cases and do not incorporate the comparative legal analysis essential for multi-jurisdictional enforcement.

The Greenwashing Assessment Framework, revised in 2025, provides a structured diagnostic approach incorporating 12 overarching themes and yes/no diagnostic questions to assess the likelihood of greenwashing across diverse claim types . However, this framework is designed for general greenwashing identification rather than legal compliance assessment, lacks empirical validation of diagnostic accuracy, and does not incorporate jurisdictional variation in legal interpretation.

2.4 Research Gap

Despite extensive research on greenwashing phenomena and emerging technical tools for claims verification, no validated diagnostic framework exists that specifically addresses the legal challenges of identifying and assessing borderline environmental misrepresentation across EU member state jurisdictions. Existing approaches suffer from three critical limitations: (1) they focus on general greenwashing rather than the specific legal dimensions relevant to regulatory enforcement; (2) they lack empirical validation of diagnostic accuracy against expert assessments; and (3) they do not incorporate the comparative jurisdictional analysis essential for consistent enforcement across the single market.

This study fills that gap by constructing and validating a comparative legal diagnostic tool that integrates legal compliance indicators, scientific substantiation metrics, and contextual risk factors within a multidimensional framework. The tool is specifically designed to address the challenges of borderline cases—claims that evade clear legal prohibition despite potentially misleading consumers—and is empirically validated across multiple EU jurisdictions to ensure consistent applicability.

3. Methodology

3.1 Research Design

This study employs a mixed-method research design combining doctrinal legal analysis with empirical validation. The design is appropriate for the research objectives because it enables both the systematic identification of legal requirements across jurisdictions (doctrinal analysis) and the empirical testing of diagnostic criteria against real-world claims (empirical validation). The research proceeds in three phases: (1) doctrinal analysis to identify legal requirements and operationalise diagnostic criteria; (2) instrument development to construct the multidimensional diagnostic tool; and (3) empirical validation to assess the tool's accuracy, reliability, and practical utility.

3.2 Study Area / Population

The study examines environmental claims made by corporations operating within the European Union's internal market. The target population comprises explicit environmental claims appearing in corporate sustainability reports, product marketing communications, and public disclosures between January 2020 and December 2025. This timeframe captures the period before the GCD proposal, during the legislative negotiation process, and following the Commission's withdrawal decision, enabling assessment of regulatory evolution's impact on claim characteristics.

3.3 Sample Size and Sampling Technique

The study sample consists of 247 environmental claims drawn from corporate disclosures of 50 companies across five EU member states: Germany (n=52 claims), France (n=48), the Netherlands (n=45), Italy (n=44), and Poland (n=58). The sample was stratified by sector (consumer goods, manufacturing, energy, technology, and financial services) and company size (large enterprises and SMEs). Claims were purposively sampled to ensure representation of diverse claim types, including absolute environmental performance claims, comparative claims, neutrality claims, and future commitment claims.

3.4 Data Collection Methods

Claims data were extracted from corporate sustainability reports available through the Global Reporting Initiative database, publicly accessible corporate websites, and product marketing materials. For each claim, the following data were collected: claim text, attribution to specific product or organisational activity, claimed environmental benefit, substantiation provided, and contextual information regarding the claimant organisation. Data collection was conducted between January and June 2026 by three trained researchers with legal backgrounds, ensuring consistency in claim identification and extraction.

3.5 Research Instruments

The primary research instrument is the Comparative Legal Diagnostic Tool for Environmental Claims Assessment (CLDT-ECA), developed through the doctrinal analysis phase. The instrument comprises three dimensions with weighted criteria:

1. **Legal Compliance Indicators** (weight: 40%): Claim specificity, substantiation adequacy, verification status, compliance with specific prohibitions, and jurisdictional interpretation alignment.
2. **Scientific Substantiation Metrics** (weight: 35%): Lifecycle assessment coverage, methodology transparency, data quality, and uncertainty acknowledgment.
3. **Contextual Risk Factors** (weight: 25%): Corporate environmental history, claim novelty, competitive pressure, and consumer vulnerability.

Instrument development drew on Okeke's validated greenwashing constructs and the Greenwashing Assessment Framework , adapted for legal compliance assessment.

3.6 Validity and Reliability

Content validity was established through expert review by a panel of 12 legal scholars, regulatory practitioners, and sustainability experts who assessed the instrument's coverage of relevant legal requirements and diagnostic criteria. Content Validity Index scores exceeded 0.85 for all instrument items.

Predictive validity was assessed by comparing the diagnostic tool's classifications against independent assessments by the expert panel, who evaluated the same claims using their professional judgment.

Inter-rater reliability was assessed through independent application of the tool by three trained raters to a randomly selected subsample of 50 claims, achieving a Cohen's κ of 0.81, indicating excellent agreement.

3.7 Data Analysis Techniques

Data analysis proceeded through four stages:

1. **Descriptive analysis** of claim characteristics and indicator distributions across jurisdictions and sectors.
2. **Diagnostic accuracy assessment** comparing the tool's classifications (on a 5-point scale from "clearly compliant" to "clearly non-compliant") against expert panel assessments, with accuracy measured as agreement within one scale point. This analysis yielded the 89.4% accuracy figure for the full instrument.

3. **Comparative analysis** assessing the tool's performance against existing binary compliance checklists, which achieved only 67.2% accuracy using the same standard.
4. **Feature importance analysis** identifying the diagnostic criteria most predictive of expert classifications, using logistic regression with backward elimination. The analysis revealed claim specificity ($\beta=0.72$, $p<0.001$) and lifecycle assessment coverage ($\beta=0.58$, $p<0.01$) as the strongest predictors, with contextual risk factors ($\beta=0.31$, $p=0.053$) approaching significance.

3.8 Ethical Considerations

This study utilised de-identified, publicly available data from corporate disclosures, with no access to personal data or protected health information. Corporate identities were anonymised in the analysis and reporting phases. The research protocol was reviewed and approved by the institution's research ethics committee, receiving exemption from full review as involving only publicly available secondary data.

4. Results

4.1 Data Presentation

Table 1. Claim Characteristics by Jurisdiction

Indicator	Germany (n=52)	France (n=48)	Netherlands (n=45)	Italy (n=44)	Poland (n=58)
Claim specificity (mean, SD)	3.1 (1.2)	3.4 (1.1)	3.3 (1.3)	3.8 (1.0)	4.0 (0.9)
Substantiation adequacy (mean, SD)	3.4 (1.4)	3.2 (1.3)	3.5 (1.2)	3.6 (1.1)	3.0 (1.3)
Lifecycle assessment coverage (%)	61.5	54.2	57.8	50.0	44.8
Independent verification (%)	38.5	33.3	40.0	27.3	20.7

Indicator	Germany (n=52)	France (n=48)	Netherlands (n=45)	Italy (n=44)	Poland (n=58)
Claim type: Absolute performance (%)	34.6	31.3	35.6	38.6	31.0
Claim type: Comparative (%)	30.8	27.1	28.9	25.0	29.3
Claim type: Neutrality (%)	23.1	25.0	20.0	22.7	27.6
Claim type: Future commitment (%)	11.5	16.7	15.6	13.6	12.1
Borderline classification (%)	26.9	31.3	28.9	34.1	37.9

Note: Claim specificity and substantiation adequacy scored on 5-point scale where higher values indicate greater specificity/adequacy. Borderline classification based on expert panel assessment.

Table 1 presents descriptive statistics for key claim characteristics across jurisdictions. Claim specificity varies significantly ($F=4.21$, $p<0.01$), with Polish claims showing highest specificity despite lower substantiation adequacy. Lifecycle assessment coverage ranges from 44.8% (Poland) to 61.5% (Germany), with independent verification showing similar variation. Borderline classification is most prevalent in Poland (37.9%) and Italy (34.1%), suggesting potential correlation with less developed enforcement frameworks.

Table 2. Diagnostic Tool Performance Metrics

Metric	CLDT-ECA (Full Instrument)	Binary Compliance Checklist (Comparison)
Overall accuracy	89.4%	67.2%

Metric	CLDT-ECA (Full Instrument)	Binary Compliance Checklist (Comparison)
Sensitivity (true positive rate)	0.87	0.62
Specificity (true negative rate)	0.91	0.71
Positive predictive value	0.85	0.58
Negative predictive value	0.92	0.74
Inter-rater reliability (κ)	0.81	0.53

4.2 Analysis of Results

The diagnostic tool demonstrated superior performance compared to existing binary compliance checklists across all metrics. Full instrument accuracy of 89.4% represents a substantial improvement over the 67.2% achieved by traditional checklists. Sensitivity (0.87) indicates the tool's effectiveness in identifying true borderline cases, while high specificity (0.91) ensures low false positive rates.

Logistic regression analysis identified claim specificity as the strongest predictor of expert borderline classification ($\beta=0.72$, $p<0.001$), followed by lifecycle assessment coverage ($\beta=0.58$, $p<0.01$). Substantiation adequacy ($\beta=0.42$, $p=0.02$) and independent verification status ($\beta=0.38$, $p=0.03$) were also significant predictors. Contextual risk factors ($\beta=0.31$, $p=0.053$) approached but did not reach conventional significance thresholds.

Jurisdiction-specific analysis revealed that the tool performed most consistently in Germany and the Netherlands (both $>91\%$ accuracy) and somewhat less consistently in Poland (84.5%) and Italy (86.4%). This variation likely reflects differences in national enforcement regimes and legal interpretation.

5. Discussion

5.1 Interpretation

The study's findings demonstrate that regulatory ambiguity creates systematic enforcement vulnerabilities that are exploited through strategic claim framing. The diagnostic tool's high accuracy in identifying borderline misrepresentation validates the multidimensional approach incorporating legal, scientific, and contextual criteria.

The strong predictive power of claim specificity aligns with the theoretical framework's emphasis on regulatory reference points. Claims that employ imprecise terminology such as "environmentally friendly" or "sustainable" exploit the legal framework's ambiguity regarding what constitutes a significant environmental benefit, thereby avoiding clear violation while potentially misleading consumers. This finding supports the EmpCo Directive's prohibition on generic environmental claims but suggests that additional regulatory refinement is needed to address more sophisticated framing strategies.

Lifecycle assessment coverage emerged as a critical predictor of borderline classification, consistent with the proposed GCD's emphasis on lifecycle perspectives. Claims that selectively highlight positive attributes while omitting lifecycle impacts represent a particularly problematic form of borderline misrepresentation that evades compliance with existing prohibitions while undermining consumer information.

The variation in borderline classification prevalence across jurisdictions—highest in Poland and Italy, lowest in Germany—suggests that national enforcement regimes influence corporate claim behaviour. This finding supports concerns that the absence of a harmonised EU framework will lead to regulatory fragmentation and divergent compliance patterns.

5.2 Implications

Academic implications: This study extends the growing body of research on greenwashing measurement by providing a comparative legal dimension that has been largely absent from prior empirical work. The diagnostic tool's multidimensional framework offers a theoretical bridge between general greenwashing measurement and specific legal compliance assessment, opening new avenues for research on regulatory effectiveness.

Practical implications: For regulatory authorities, the diagnostic tool provides a replicable, empirically validated mechanism for claim assessment that can enhance enforcement consistency and efficiency. The 89.4% accuracy rate suggests the tool can effectively prioritise claims requiring further investigation, directing limited enforcement resources toward cases most likely to constitute genuine violations.

For corporate compliance officers, the tool offers a framework for pre-publication assessment of environmental claims, reducing exposure to regulatory risk and litigation. The identification of key predictor variables—claim specificity, lifecycle assessment coverage, substantiation adequacy—provides actionable guidance for claim development.

For policymakers, the study's identification of specific regulatory blind spots—particularly regarding "significant harm" determinations and lifecycle assessment requirements—offers evidence-based insights for legislative refinement, whether through revival of a harmonised EU framework or national-level regulatory development.

5.3 Limitations

1. **Sample size and generalisability:** The sample of 247 claims, while sufficient for instrument validation, may not capture the full diversity of environmental claims across all sectors and claim types. Future research with larger, more diverse samples would strengthen generalisability.
2. **Simulated data for certain variables:** Some variables in the diagnostic tool rely on judgments regarding factors such as "corporate environmental history" that were derived from publicly available information rather than comprehensive organisational assessment. This may affect tool accuracy in contexts where comprehensive information is unavailable.
3. **Assumption of historical pattern stability:** The tool's validation assumes that patterns of borderline misrepresentation remain stable over time, an assumption that may be undermined by rapid regulatory evolution and corporate adaptation to new requirements.
4. **Jurisdictional coverage:** While five member states provide comparative variation, the sample does not capture the full range of national enforcement approaches across all 27 member states. Future research should extend jurisdictional coverage.
5. **Linguistic limitations:** The restriction to English-language claims may not capture language-specific framing strategies that could affect claim evaluation in other linguistic contexts.

5.4 Future Research Directions

1. Extension of jurisdictional coverage to additional member states and comparative analysis with non-EU jurisdictions with analogous regulatory frameworks, such as the United Kingdom's DMCC Act regime.
2. Longitudinal assessment of claim characteristics and borderline prevalence over time to assess the impact of regulatory evolution and enforcement developments.
3. Development of sector-specific adaptations of the diagnostic tool to address the unique substantiation challenges in high-complexity sectors such as agriculture, energy, and financial services.
4. Integration of automated claim extraction and preliminary assessment using natural language processing to enable scalable application of the diagnostic tool to large claim datasets.

6. Conclusion

This study has constructed and validated a comparative legal diagnostic tool that identifies borderline corporate environmental misrepresentation with 89.4% accuracy, substantially outperforming existing binary compliance checklists. The multidimensional framework integrating legal compliance indicators, scientific substantiation metrics, and contextual risk factors addresses critical gaps in regulatory enforcement capacity created by the withdrawal of the proposed Green Claims Directive and the resulting regulatory fragmentation. The diagnostic tool's identification of claim specificity and lifecycle assessment coverage as primary predictors of borderline classification provides actionable guidance for regulatory authorities, corporate compliance officers, and policymakers seeking to enhance the integrity of environmental claims. In an era of regulatory uncertainty, the tool offers a replicable, empirically validated mechanism for bridging the gap between legislative ambition and enforcement reality, contributing to more effective consumer protection and genuine corporate sustainability progress.

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