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Green Signals, Red Flags: The Impact of Greenwashing Allegations and Crisis Communication on Corporate Perceptions

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ABSTRACT

Greenwashing allegations threaten the legitimacy of ESG investments and can shape public perceptions. Drawing on signaling theory and crisis communication, we examine how the source and type of greenwashing allegations as well as a firm's crisis response strategy affect corporate image and investor behavior. The study focuses on three core factors: the source of the allegation, the type of greenwashing, and the crisis response strategy. It employs a dual-experimental design. Study 1 manipulates the type (cheap talk vs. fraud) and source (whistleblower vs. watchdog) of greenwashing allegations, while Study 2 examines the effects of corporate response strategies (proactive vs. defensive strategy vs. no response) to the most detrimental scenario from Study 1. The findings show that both fraud allegations and whistleblower sources each eroded corporate image, with their effects being largely additive. Investment behavior was shaped by the interaction between allegation type and source: the combination of whistleblower and fraud allegations produced the strongest negative impact. A proactive response to these greenwashing allegations was more effective at preserving corporate image than a defensive, and any response proved better than remaining silent. However, the type of crisis response did not significantly influence immediate investment allocations. Overall, the findings underscore the high diagnosticity of insider fraud signals and the effectiveness of accountability-focused responses for image repair, while suggesting that investment behavior is less susceptible to immediate messaging in times of crisis.

The growing integration of environmental, social, and governance (ESG) factors into corporate communication has intensified concerns about greenwashing, i.e., when companies exaggerate or falsify sustainability efforts for reputational or financial gain (De Jong et al. 2020). This risk is especially pronounced in the financial sector, where ESG commitments rely heavily on voluntary and weakly regulated disclosures (Sklavos et al. 2025). As sustainability communication becomes central to business strategy, credible ESG commitments are vital for legitimacy and financial stability (Edelman 2022; Pope and Wæraas 2016). Yet, driven by *pressure* to overstate ESG performance, the *opportunities* afforded by weak regulatory environments, and the *rationalization* of deception as morally acceptable (Kurpierz and Smith 2020), greenwashing often undermines the credibility and legitimacy of ESG claims.

In light of these challenges, this study examines how greenwashing allegations and corporate crisis responses influence both corporate image and investor behavior. Drawing on *Signaling Theory* and *Crisis Communication Theory*, it explores how financial institutions signal their ESG commitments and how individuals interpret these signals when allegations of misconduct emerge. Specifically, the study investigates how two factors–the type of allegation, ranging from vague, unverifiable cheap talk, to clear instances of intentional fraud,

and the source of the allegation, namely watchdogs versus whistleblowers–influence corporate image and investment behavior. It further explores which crisis response strategies, proactive or defensive, are most effective in mitigating the negative effects of greenwashing allegations.

Although *Signaling Theory* has been widely applied in fields such as finance (Francis et al. 2010), strategic management (Basdeo et al. 2006), corporate governance (Certo 2003), marketing (Kirmani and Rao 2000), and sustainability communication (Nothhaft and Seiffert-Brockmann 2023), its application to the specific issue of greenwashing remains limited (with Marschlich and Hurtado (2025) providing a notable exception). While existing research suggests that greenwashing may negatively affect corporate image and investor confidence (Lins et al. 2017; Nicolas et al. 2024; Yang 2024), the extent and nature of these effects remain unclear. The complexity of detecting and evaluating greenwashing in the financial sector underscores the need for a more nuanced understanding, leading to the central question of this study: (RQ) *How do various forms of greenwashing allegations affect a) a financial institution's image and b) investor behavior?*

This paper contributes to filling that gap by introducing a signaling-based framework for analyzing how greenwashing allegations affect the corporate image of financial institutions and investor behavior. In doing so, it offers three key contributions to public relations and crisis communication research. First, it is the first study to apply *Signaling Theory* to examine the consequences of greenwashing allegations in the financial sector, an understudied yet increasingly relevant area (Friske et al. 2023). Second, it provides empirical insights into how the nature and source of greenwashing allegations shape perceptions of corporate image and influence investor behavior. Finally, by evaluating various crisis response strategies, it identifies how financial institutions can mitigate damage to their corporate image and restore stakeholder trust in the wake of ESG-related controversies.

1 | Signals of Deception: Greenwashing's Impact on Corporate Image and Investor Behavior

The rise of ESG frameworks in financial markets has intensified scrutiny of corporate sustainability communication, making greenwashing a central concern in sustainable finance (De Jong et al. 2020). While sectors such as consumer goods, healthcare, industrials, and technology communicate ESG efforts to meet investor expectations (Matakanye et al. 2021), the financial sector is particularly vulnerable due to the intangible nature of ESG products and the lack of standardized global disclosures (Nazarova et al. 2023). Greenwashing arises when organizations overstate sustainability performance through selective reporting or symbolic actions, creating a gap between claims and actual practices. Although no consensus definition exists, Koch and Denner (2025a), based on a review of 332 articles and 646 definitions, define it as a discrepancy between environmental communication and actual practices, where firms portray themselves, their products, or processes as more environmentally friendly through false, vague, irrelevant, or selective information (Koch and Denner 2025a). The concept also extends to misleading social and governance disclosures (Gatti et al. 2025). By distorting ESG information, greenwashing misleads investors, erodes market confidence and highlights the need for credible communication to sustain corporate image and reputation (Kurpierz and Smith 2020; Signitzer and Prexl 2007; UN 2023).

From a *Signaling Theory* perspective, ESG communication shapes stakeholder perceptions by signaling a firm's commitment to sustainability (Healy and Palepu 2001; Spence 1973). *Signaling Theory* explains how two parties reduce information asymmetry (Connelly et al. 2011): a signaler (e.g., a financial institution) holds information that receivers (e.g., stakeholders) lack, creating uncertainty about quality or performance (Spence 2002). To reduce this uncertainty, signalers send observable, sufficiently costly signals that credibly reflect underlying quality. Receivers, though lacking inside information, benefit by interpreting these signals when making decisions, and signaling succeeds when signals are trustworthy and improve decision-making for both sides (Spence 1973, 2002). In sustainability contexts, signals such as ESG reports, certifications, labels and targeted campaigns communicate commitment (Healy and Palepu 2001; Spence 1973). However, when both genuinely responsible and deceptive firms use the same signals, a pooling equilibrium arises, making it difficult for stakeholders to distinguish authentic sustainability efforts from greenwashing (Spence 1973). Vague or misleading disclosures, so called cheap talk, may appear credible, weakening honest communication and eroding trust (Kurpierz and Smith 2020; Lyon and Maxwell 2011).

Greenwashing is especially pronounced in financial markets, where voluntary ESG reporting allows financial institutions to emphasize positive aspects while concealing negatives, distorting competition and misleading investors (Lyon and Maxwell 2011). Although it may offer short-term gains, exposure carries long-term reputational and financial risks, damaging corporate image and stakeholder trust. Gatti et al. (2019) note that greenwashing persists because sustainability communication exists in a gray zone, rewarding appearances of being green while imposing few consequences for exaggeration. Solutions include clearer definitions, stronger verification, and alignment between communication and actual performance (Gatti et al. 2019). Clear, credible signals help distinguish genuinely sustainable firms from those merely appearing green, reducing information asymmetry between companies and stakeholders (Itan et al. 2025).

A *separating equilibrium* arises when the costs of deception, e.g., legal, reputational, or financial, are high enough to deter insincere behavior. Mechanisms such as transparency, third-party audits, independent certifications, and watchdog or whistleblower disclosures raise these costs (Kirmani and Rao 2000; Simnett et al. 2009; Xie and Kronrod 2012), reinforcing authentic ESG communication. Stronger ESG regulations, standardized reporting frameworks, and fraud detection systems are increasingly necessary to maintain this separation and curb greenwashing (Kurpierz and Smith 2020).

ESG disclosures signal a company's genuine commitment to sustainability, engaging stakeholders, enhancing corporate value, and building public trust through accountability and transparency (Itan et al. 2025; Maaloul et al. 2023). As ESG

factors increasingly shape investor confidence, regulatory compliance, and financial performance, credible ESG disclosure has become central to long-term corporate sustainability and corporate image (Itan et al. 2025). Drawing on *Signaling Theory*, clear and consistent ESG communication reduces information asymmetry by conveying reliability and transparency, allowing stakeholders to infer otherwise unmeasurable qualities and make informed decisions (Connelly et al. 2025; Zhang et al. 2024).

The same signaling principle applies to crisis communication. In situations of information asymmetry, transparent, authentic, and stakeholder-focused messaging is essential for maintaining trust. Firms that replace partial or misleading information with clear disclosures can turn crisis risks into long-term brand value (You et al. 2025). Consistent, accurate communication during crises strengthens stakeholder perceptions of reliability, mitigates reputational damage, and reinforces trust, while weak or absent signals exacerbate uncertainty; even acknowledging incomplete information can serve as a credible signal (Badu et al. 2023; Nuortimo et al. 2024). Thus, ESG and crisis communications alike function as signals that reduce information asymmetry, reinforce corporate image, and guide stakeholder decision-making.

2 | Greenwashing in ESG Communication: Cheap Talk or Fraud?

Within the framework of greenwashing as strategic misrepresentation, scholars distinguish two main types. The first, often called cheap talk, involves vague or unverifiable sustainability claims that, while not outright false, lack substantive backing and accountability (Kurpierz and Smith 2020). These claims exploit voluntary ESG disclosures to enhance corporate reputation without delivering meaningful environmental impact. Ethically questionable, this form does not necessarily constitute fraud, as firms may exaggerate performance without causing direct harm. In contrast, fraudulent greenwashing entails deliberate deception through false or concealed information intended to mislead stakeholders. While greenwashing and fraud share structural similarities, fraud requires demonstrable harm, whereas greenwashing often produces more diffuse societal harm that is harder to measure or legally attribute (Kurpierz and Smith 2020).

Both forms contradict actual corporate practices, and allegations of greenwashing can severely undermine corporate image, a long-term perception shaped by accumulated messages and stakeholder experiences (Fombrun 1997; Jo Hatch and Schultz 2003; Howcroft 1991). A strong corporate image builds credibility, fosters customer loyalty, shapes investor attitudes (Wallin Andreassen and Lindestad 1998; Fombrun and Shanley 1990; Keller and Aaker 1997), and attracts talent (Dowling 1988; Lemmink et al. 2003; Riordan et al. 1997). In the financial sector, corporate image is multidimensional, encompassing service quality, credibility, innovation, managerial reputation, accessibility, trust and security (van Heerden and Puth 1995; LeBlanc and Nguyen 1996). Even minor inconsistencies between environmental messaging and actual practices, hallmarks of greenwashing, can damage credibility and corporate image (Keilmann and Koch 2023).

Research shows that perceptions of greenwashing negatively affect corporate image and can provoke strong negative emotions such as brand hate (Khandai et al. 2025). These effects are mediated by perceived environmental performance and risk (Santos et al. 2024). Credibility is particularly fragile in sustainability communication: even small gaps between claims and practices significantly reduce public trust (Koch and Denner 2025b). Moreover, different forms of greenwashing influence consumer attitudes in distinct ways, with perceived deception leading to lower brand evaluations and decreased purchase intentions (Bladt et al. 2024). These findings highlight not only reputational risks of greenwashing but also the need for a nuanced understanding of how stakeholders perceive and react to its various forms.

The repercussions extend to financial performance. Greenwashing behaviors are associated with declines in corporate financial performance and can erode investor confidence, prompting negative market reactions (Yang 2024). ESG-related reputational risks linked to perceived greenwashing correspond to significant reductions in abnormal stock returns (Nicolas et al. 2024) and can hinder access to green capital (Deng et al. 2024). Allegations of misleading ESG claims correlate with reduced investor trust (Lins et al. 2017), weaker firm performance and lower stock returns (Nicolas et al. 2024; Yang 2024). These challenges are compounded by inconsistent reporting standards and unreliable data, making it difficult for investors to verify sustainability claims (Chen et al. 2021) and encouraging capital shifts toward firms with greater transparency and governance (Schwertner and Sohn 2024).

ESG-related cheap talk refers to vague or unverifiable sustainability claims that enhance a company's image without requiring meaningful action or legal consequences (Kurpierz and Smith 2020). Large asset managers often make broad statements about "supporting sustainability" or "aligning with net-zero goals" in reports or marketing materials, yet provide no measurable targets or evidence of progress, claims that rarely face scrutiny or penalties (ESG Guide 2023). While ethically questionable, such communication generally involves exaggeration rather than outright deception, and its reputational impact is often limited (Kurpierz and Smith 2020). In contrast, fraudulent greenwashing goes further by creating distorted perceptions of a company's environmental performance through strategic, selective communication. Economically rational but ethically problematic, it frequently attracts criticism from stakeholders and can undermine credibility more severely, leading to lasting reputational and market consequences (Lyon and Maxwell 2011). High-profile cases, such as BlackRock's mislabeling of fossil-fuel-heavy funds as "sustainable" (FinTech Global 2024) and DWS's overstated ESG integration (Murphy 2024), illustrate these risks and have triggered regulatory investigations and public backlash (Authors).

Research consistently shows that exaggerated environmental claims erode brand trust and corporate image (Chen and Chang 2013; Khandai et al. 2025). Previous research indicates a tendency for stakeholders to respond more strongly to deliberate and deceptive forms of greenwashing than to minor inconsistencies or cheap talk (e.g., De Jong et al. 2020; Keilmann and Koch 2023). Building on these findings, we assume that fraudulent greenwashing is likely to elicit stronger negative reactions and have more severe consequences for

corporate image and financial performance. We therefore propose the following hypothesis:

H1. *Fraudulent greenwashing allegations will have a more negative impact on (a) corporate image and (b) investment behavior than cheap talk allegations.*

3 | Greenwashing Allegation Sources: Watchdogs Versus Whistleblowers

In sustainable finance, greenwashing allegations reveal gaps between corporate ESG claims and actual practices (cf. Authors). These allegations often originate from watchdogs such as NGOs, journalists, and auditors, who scrutinize sustainability claims and hold firms accountable (Seele and Gatti 2017). NGOs play a key role in promoting transparency, particularly where regulatory oversight is weak (Aldashev et al. 2015). Financial journalists amplify findings of other intermediaries and conduct investigative reporting, thereby shaping public opinion and market perceptions (Miller 2006). Auditors are also responsible for detecting misconduct, but their effectiveness can be limited by professional norms and organizational culture, as exemplified by *Wells Fargo*'s internal auditors failing to report the cross-selling fraud (Antonacopoulou et al. 2019).

Among detection mechanisms, whistleblowers, typically current or former employees, are often the most effective in uncovering corporate misconduct (Authors; Near and Miceli 1985; Seele and Gatti 2017). With direct access to internal operations, whistleblowers can identify irregularities early and provide detailed, credible information. Empirical evidence underscores their impact: Dyck et al. (2010) found that whistleblowers accounted for 18.3% of alleged fraud cases in large US firms (1996–2004), while the ACFE (2022) reported that 42% of fraud cases were revealed through tips, over half from employees. Such disclosures often trigger significant consequences; for example, Dyck et al. (2010) observed average firm stock declines of 20% in the 2 days surrounding a public fraud revelation.

Both watchdogs and whistleblowers are central to uncovering ESG-related misconduct, yet their perceived legitimacy and informational access differ substantially. Watchdogs, though important external monitors, are sometimes viewed as ideologically biased or insufficiently informed (Smaili and Arroyo 2019). Whistleblowers, by contrast, draw on privileged insider information, which enhances the credibility and impact of their allegations (Authors; Near and Miceli 1985). Because of this elevated credibility, whistleblower allegations often provoke more intense stakeholder reactions, amplifying reputational and financial consequences. While potentially damaging for firms, whistleblowing remains a cornerstone of ethical business practice (Purdy 2021). Accordingly, we hypothesize:

H2. *Allegations from whistleblowers will lead to stronger negative effects on (a) corporate image and (b) investment behavior than those from watchdogs.*

4 | Crisis Communication Strategies in Response to Greenwashing Allegations

Greenwashing allegations can quickly escalate into full-blown crises that undermine stakeholder trust and threaten organizational performance (Coombs 2010). In the ESG context, such crises often stem from weak sustainability strategies, inadequate measurement systems, or scandals, potentially resulting in stock market losses, regulatory scrutiny and long-term reputational damage (cf. Authors). However, their severity depends not only on the allegations themselves but also on how organizations respond (Neumann and Forthmann 2024). Situational Crisis Communication Theory (SCCT) provides a key framework, arguing that response effectiveness depends on stakeholders' attributions of responsibility and the degree of accommodation expressed in communication (Coombs 2007; Coombs and Holladay 2002).

Crisis communication aims to shape stakeholder interpretations, reduce uncertainty and restore legitimacy (Coombs and Holladay 2004). SCCT distinguishes between victim, accidental, and preventable crises, suggesting that higher perceived responsibility requires more accommodative responses such as apology or corrective action, whereas lower responsibility allows for defensive strategies (Coombs 2007). As responsibility attributions increase, so does the need for accommodation (An et al. 2011). Accordingly, internal crises often demand acknowledgment, while externally driven crises may allow organizations to frame themselves as victims or share responsibility (Coombs and Holladay 2004). Yet crisis communication is not a one-off reaction, but an ongoing, multi-actor process shaped by governance capacity and institutional legitimacy. When responsibility and communication are distributed across actors and governance levels, organizations face coordination challenges and risks of inconsistent messaging. Legitimacy therefore depends not only on message content but also on coherence, adaptability and sustained sense-making (Lund-Tønnesen and Christensen 2023). Crisis responses thus range along a continuum from defensive to accommodative strategies, and although apology is often considered ethical and effective, its success depends on crisis type and stakeholder expectations (Coombs and Holladay 2008).

While research often analyzes response strategies in isolation, organizations typically combine them to address different stakeholders and crisis stages (Coombs 2007; Coombs and Holladay 2008; Park 2017). Firms may integrate factual disclosures (information strategy) with expressions of empathy (sympathy strategy) or blend apology with partial defense. A meta-analysis of 110 studies (1986–2016) by Arendt et al. (2017) identifies corrective action as the most effective strategy, particularly when combined with other accommodative elements, whereas denial is consistently least effective despite frequent use (Arendt et al. 2017). Overall, crisis responses seek to reduce uncertainty and perceived responsibility while restoring legitimacy (Coombs and Holladay 2004; Luoma-aho et al. 2017).

Traditionally, crisis communication research has emphasized private organizations' reputation management and blame avoidance (Olsson 2014). However, a broader perspective highlights resilience-oriented and operational communication, which prioritizes transparency, speed, tone and practical information in real time. In digital media environments, trust increasingly depends on authentic, human communication rather than formal corporate messaging. Effective crisis management therefore requires integrating reputation-oriented and operational communication in a context where audiences actively seek and share information (Olsson 2014).

Building on past literature, the present study adopts Luoma-aho et al.'s (2017) typology of crisis response strategies: information (verifiable details), sympathy (expressions of concern), apology (acceptance of responsibility and corrective action) and defense (rejection or alternative interpretations). We group these into two overarching orientations. A proactive response combines information, sympathy and apology, reflecting a responsibility-oriented approach that integrates transparency and accommodation. By contrast, the defensive response is operationalized narrowly as denial, i.e., the explicit rejection of allegations, ensuring a clear contrast between responsibility-taking (proactive) and responsibility-rejecting (defensive) communication (cf. Coombs 2007; Luoma-aho et al. 2017). The sit-out strategy is excluded, as the study focuses on active corporate engagement. By analyzing these strategies in combination rather than isolation, this research addresses a key gap in ESG crisis communication and reflects how financial institutions manage ESG crises in real-world contexts.

Based on this, we hypothesize:

H3. *A proactive crisis response will mitigate damage to* (*a*) *corporate image and* (*b*) *investment behavior more effectively than a defensive response.*

To test the hypotheses, we conducted two between-subjects online experiments. The study has been approved by the Faculty of Arts and Social Sciences Ethics Committee at the first author's university (N° 25.05.04) and preregistered on OSF (https://osf.io/wu634/overview?view_only=484f1e0abd4e4687be2e636ed6bb7f92).

5 | Study 1

Study 1 tested the effects of different types and sources of greenwashing allegations on corporate image and investment behavior (H1 and H2).

5.1 | Methods – Study 1

We implemented a between-subjects experiment with a 2 by 2 design and a neutral control group. The manipulated factors were the type of allegation with the levels cheap talk and fraud, and the source with the levels watchdog and whistleblower. All materials referenced a fictitious financial news outlet named *European Markets Insights* and a fictitious asset manager named *Evergreen Investment Group* with its *Evergreen Future Fund* to avoid bias due to existing brand attitudes. In this way, internal validity was ensured.

We developed concise news-ticker texts that mirrored specialist business reporting (Strauß 2021) and presented them as LinkedIn-style posts from *European Markets Insights* (see Appendix 1). The internal whistleblower condition described a leading manager at *Evergreen Investment Group* who raised the allegation based on first-hand knowledge of internal documents. The external watchdog condition described an international and independent group of experts without closer ties to the company. The fraud condition portrayed clear deception in the presentation of the fund in the form of false ESG criteria or performance and made explicit that investors could be misled. The cheap talk condition portrayed the fund in an overly optimistic light without adequate substantiation and that could create a misleading sustainability impression. We held length, tone, and layout constant so that only source and type varied. Pretests with a student sample and two soft-launch waves in the panel informed minor presentational adjustments to increase source salience. We added a clear source label and replaced an image to improve recall while keeping the content unchanged.

Regarding the measures, corporate image was assessed with a seven-point semantic differential comprising six adjective pairs adapted from Koch and Denner (2025b). Three items captured the cognitive dimension (incompetent–competent, unprofessional–professional, not capable–capable), while three items measured the affective dimension (unfriendly–friendly, not likeable–likeable, not genuine–genuine). Items were coded so that higher values indicate a more positive image and were averaged to an index with high internal consistency ($M = 4.13$, $SD = 0.97$; $\alpha = 0.899$). The measurement of investment behavior followed Lingnau et al. (2022). Participants imagined an endowment of 10,000 CHF and used a slider with steps of 100 CHF to indicate how much they would allocate to the *Evergreen Future Fund*. We analyzed the share invested by dividing the chosen amount by 10,000 as standardized index ($M = 0.21$, $SD = 0.15$).

Participants were recruited by the commercial panel provider *Bilendi* using quota sampling on age, gender, and education to approximate the Swiss population. Prior to data collection, an a priori power analysis conducted in *G*Power* indicated a required total sample size of $n = 327$ for the planned analyses. We oversampled beyond this target to compensate for anticipated exclusions due to failed attention checks. The final sample size in Study 1 was after data cleaning $n = 350$. Respondents' ages ranged from 21 to 71 years ($M = 42.23$, $SD = 11.35$ years). The gender distribution was 41.1% ($n = 205$) male and 58.6% ($n = 144$) female. 0.3% ($n = 1$) did not provide gender information.

After informed consent participants received a short primer on ESG investing to standardize baseline knowledge. They were then randomized to the control or one of the four experimental conditions and viewed the LinkedIn-style post with the respective allegation constellation and then completed a manipulation check. Afterwards, participants reported corporate image perceptions and their investment allocation. Finally, they provided demographic information and received a debrief. We excluded participants who failed the manipulation check. Individuals without any investment experience were screened out and routed to the end of the questionnaire. Their data were not used.

Prior to the data analysis, we verified the manipulations and conducted randomization checks on baseline characteristics. These tests indicated no systematic group differences in gender ($\chi^2(8) = 6.556$, $p = 0.585$), age ($F(4, 345) = 0.925$, $p = 0.449$), education ($\chi^2(32) = 38.624$, $p = 0.195$), occupation ($\chi2(28) = 24.243$, $p = 0.669$), income ($\chi^2(32) = 24.584$, $p = 0.823$), or investment experience ($\chi^2(12) = 18.017$, $p = 0.115$), which supports the conclusion that random assignment was successful. We then tested overall group differences with one-way ANOVAs across the five groups with appropriate post-hoc procedures, followed by a 2×2 General Linear Model on the four allegation constellations (control excluded) to estimate main

effects and their interaction. All tests used a two-sided alpha of 0.05, and we report F statistics, p values, effect sizes, and estimated marginal means (EMMs).

5.2 | Results – Study 1

For corporate image (H1a and H2a), a one-way ANOVA across the five conditions (control; watchdog x cheap talk; whistleblower x cheap talk; watchdog x fraud; whistleblower x fraud) revealed significant differences, $F(4, 345) = 12.29$, $p < 0.001$, $\eta^2 = 0.125$. Levene's test suggested slight heterogeneity of variances ($p = 0.042$), so we interpreted Games-Howell post hoc tests (Field 2018). The control group, who received neutral information about the fund reported the most favorable image ($M = 4.77$, 95% CI [4.53, 5.01]), and each allegation condition yielded lower image evaluations: watchdog x cheap talk ($M = 4.26$, 95% CI [4.03, 4.49]), whistleblower x cheap talk ($M = 4.04$, 95% CI [3.83, 4.25]), watchdog x fraud ($M = 4.07$, 95% CI [3.85, 4.29]), and whistleblower x fraud ($M = 3.67$, 95% CI [3.49, 3.85]) (see Table 1).

Relative to control, all allegation groups were significantly lower (all p values ≤ 0.021). Within the allegation groups, the whistleblower x fraud condition was significantly lower than in the watchdog x cheap talk condition ($\Delta = -0.59$, $p < 0.001$) and watchdog x fraud condition ($\Delta = -0.40$, $p = 0.041$). Other pairwise differences among the remaining allegation conditions were not significant. To test the factorial hypotheses directly, we estimated a 2×2 GLM on the four allegation groups. Both factors showed significant main effects, whereas the interaction was not significant: fraud yielded lower image than cheap talk, $F(1, 289) = 6.73$, $p = 0.010$, partial $\eta^2 = 0.023$ (EMMs: 3.87 vs. 4.15), and whistleblower yielded lower image than watchdog, $F(1, 289) = 8.17$, $p = 0.005$, partial $\eta^2 = 0.028$ (EMMs: 3.86 vs. 4.16), with a non-significant type x source interaction, $F(1, 289) = 0.75$, $p = 0.388$, partial $\eta^2 = 0.003$ (see Figure 1).

These results support H1a and H2a. Both fraud allegations and whistleblower sources harmed corporate image. However, they did so independently rather than synergistically. The combination did not intensify the effect beyond the sum of their separate impacts (no interaction).

For investment behavior (H1b and H2b), the one-way ANOVA indicated a smaller but significant overall effect, $F(4, 330) = 4.17$, $p = 0.003$, $\eta^2 = 0.048$. The investment index slightly differed between the control group ($M = 0.28$, 95% CI [0.22, 0.35]), the watchdog x cheap talk group ($M = 0.19$, 95% CI [0.14, 0.25]), the whistleblower x cheap talk group ($M = 0.21$, 95% CI [0.15, 0.28]), the watchdog x fraud group ($M = 0.25$, 95% CI [0.20, 0.31]), and the whistleblower x fraud group ($M = 0.14$, 95% CI [0.09, 0.18]) (see Table 2).

The homogeneity assumption held ($p = 0.167$), and Gabriel post hoc tests (Field 2018) showed that the whistleblower x fraud allegations significantly led to lower allocations than in the control condition ($\Delta = -0.14$, $p = 0.003$) and lower allocations than in the watchdog x fraud condition ($\Delta = -0.12$, $p = 0.015$), while other pairwise differences were not significant. In the corresponding 2×2 GLM on the allegation groups, the type x source interaction was significant, $F(1, 275) = 6.65$, $p = 0.010$, partial $\eta^2 = 0.024$, whereas the main effects were not, type, $F(1, 275) = 0.11$, $p = 0.742$, and source, $F(1, 275) = 3.38$, $p = 0.067$. EMMs indicated a crossover pattern (see Figure 2). In watchdog scenarios, investment tended to be higher for fraud than for cheap talk (0.254 vs. 0.195). In contrast, in whistleblower scenarios, investment was lower for fraud than for cheap talk (0.138 vs. 0.214).

Thus, H1b and H2b are not supported as main effects. Instead, investment choices depend on the interaction between source and type, whereas both main effects were non-significant. The whistleblower x fraud condition led to significantly lower allocations than both the control condition and the watchdog x fraud condition. This identifies whistleblower x fraud as the most detrimental configuration for investment behavior.

Taken together, Study 1 shows robust, additive penalties of fraud and whistleblower cues on corporate image and a contingent pattern for investment behavior in which the whistleblower x fraud scenario uniquely lowers allocation. These findings motivate the focus of Study 2 on crisis response strategies in the internal whistleblower x fraud context.

5.3 | Discussion – Study 1

When a company is involved in a scandal, its corporate image declines significantly compared to non-scandal situations (Zhang et al. 2019), and allegations of misconduct consistently damage corporate image (Decker 2012). Empirical evidence from this study further shows that the extent of image damage depends heavily on both the nature and source of the allegations. This finding aligns with prior research indicating that investors react most negatively when coverage is credible, detailed, and directly attributes blame to the company (Carberry et al. 2018). Clear and verifiable signs of misconduct, such as fraud, cause stronger image deterioration than vague or unsubstantiated claims, supporting H1a. Moreover, whistleblower allegations are perceived as more damaging than those made by external watchdogs, supporting H2a. These results highlight the central role of signaling in shaping how

TABLE 1 | Corporate image after greenwashing allegations in the experimental conditions.

Group	M_{Image}	SD_{Image}	95% CI
Control Group (Neutral)	4.77	0.90	[4.53, 5.01]
Watchdog x Cheap Talk	4.26	0.99	[4.03, 4.49]
Whistleblower x Cheap Talk	4.04	0.80	[3.83, 4.25]
Watchdog x Fraud	4.07	1.02	[3.85, 4.29]
Whistleblower x Fraud	3.67	0.77	[3.49, 3.85]

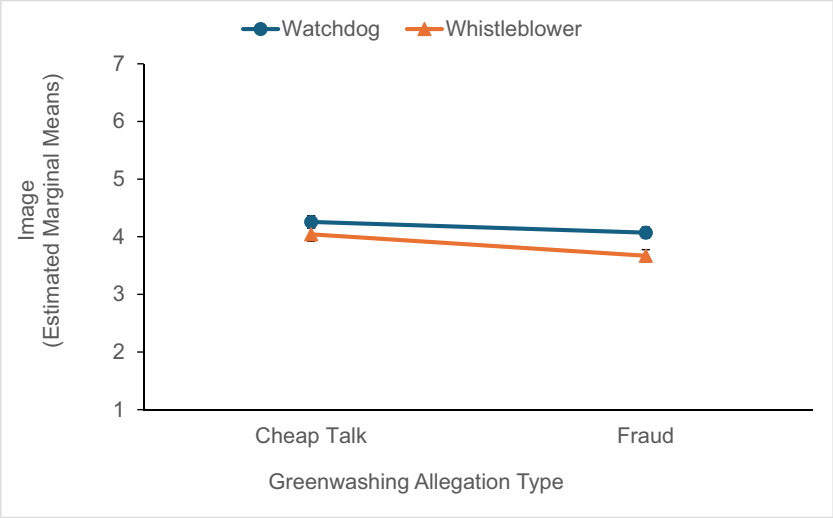

FIGURE 1 | No interaction between allegation type and source on image (estimated marginal means with 95% confidence intervals) (*Source:* authors' own creation).

TABLE 2 | Investment behavior after greenwashing allegations in the experimental conditions.

Group	$M_{Investment}$	$SD_{Investment}$	95% CI
Control Group (Neutral)	0.28	0.25	[0.22, 0.35]
Watchdog x Cheap Talk	0.19	0.22	[0.14, 0.25]
Whistleblower x Cheap Talk	0.21	0.23	[0.15, 0.28]
Watchdog x Fraud	0.25	0.23	[0.20, 0.31]
Whistleblower x Fraud	0.14	0.18	[0.09, 0.18]

Note: Investment was measured as an index by dividing the allocated amount by 10,000 (0–1).

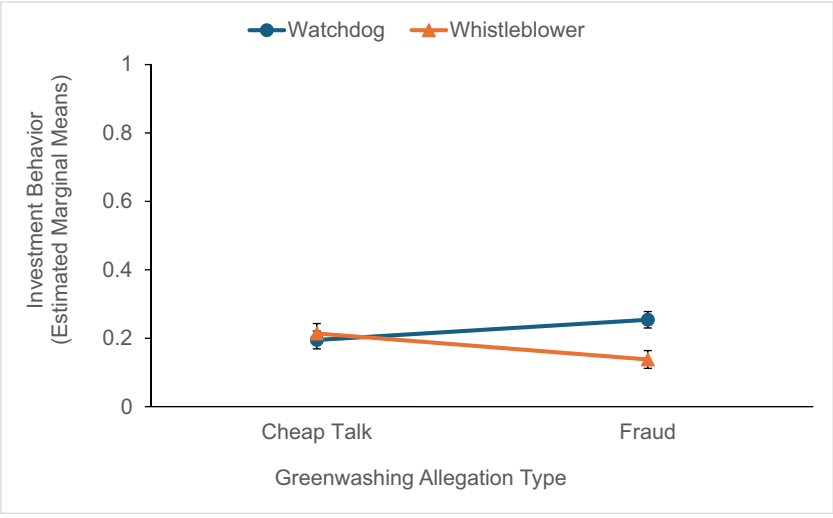

FIGURE 2 | Interaction between allegation type and source on investment behavior (estimated marginal means with 95% confidence intervals) (*Source:* authors' own creation).

stakeholders interpret greenwashing accusations. The perceived insider knowledge of whistleblowers amplifies their impact, showing that the allegation source can significantly intensify harm to corporate image.

In contrast, investment behavior (H1b) appears to depend on the interaction between the type and source of allegations. Fraud accusations made by whistleblowers, rather than watchdogs, trigger the strongest investor reactions, suggesting that investors assess both severity and credibility before making financial decisions. This implies that financial institutions cannot rely solely on either the nature of the misconduct or its origin; rather, the combination of both determines financial outcomes. Investors respond most sharply when fraud allegations are reported by credible, insider sources (i.e.,

whistleblowers), indicating that neither severity nor credibility alone suffices, both dimensions jointly shape investment responses. Indeed, earlier research shows that even subtle forms of greenwashing can erode trust, increase perceived risk, and foster brand aversion, thereby undermining credibility (Santos et al. 2024). Consequently, corporate image outcomes are primarily influenced by either the type or source of allegations, while investment behavior depends on their interaction.

6 | Study 2

Based on the results of Study 1, Study 2 tested the effects of different crisis response strategies after internal whistleblower x fraud greenwashing allegations on corporate image and investment behavior (H3).

6.1 | Methods – Study 2

Study 2 mirrored the general procedure of Study 1 but focused on crisis responses. Participants first viewed the internal whistleblower x fraud allegation stimulus from Study 1. They were then presented with a LinkedIn-style post from *Evergreen Investment Group* that contained the company's reaction (see Appendix 2). The crisis response statements were developed based on prior research on crisis communication and reputation management (Coombs and Holladay 2008; Luoma-aho et al. 2017; Singh et al. 2020). The reaction varied between two strategies. The proactive crisis response condition combined information, sympathy, and apology. The defensive crisis response condition used denial. The control group did not see a crisis reaction at all (Claeys and Cauberghe 2014). To increase authenticity and align with asset-management discourse, the company posts each included a concise CEO quote.

Measures were identical to Study 1. Corporate image was assessed with the six-item, seven-point semantic differential index (Koch and Denner 2025b; $M = 4.11$, SD = 1.14, $\alpha = 0.921$). Investment behavior was measured with the 10,000 CHF allocation slider and analyzed as the standardized share invested (Lingnau et al. 2022; $M = 0.19$, SD = 0.24).

Participants were again recruited via *Bilendi* with quota sample on age, gender, and education to approximate the Swiss population. Participants from Study 1 were not invited to participate in Study 2. Power analysis resulted again in a target sample size of $n = 327$. Again, we oversampled to compensate for anticipated exclusions due to failed treatment checks. The cleaned dataset comprised $n = 362$ respondents with 50.0% female, ($n = 181$), 49.4% male ($n = 179$), and 0.6% non-binary ($n = 2$), aged 18–79 years ($M = 47.62$, SD = 16.01). Randomization checks indicated no significant group differences regarding the distribution of participants' gender ($\chi^2(4) = 3.831$, $p = 0.429$), age ($F(2,359) = 0.828$, $p = 0.438$), education ($\chi^2(16) = 25.618$, $p = 0.060$), occupation ($\chi^2(14) = 13.605$, $p = 0.480$), income ($\chi^2(16) = 11.706$, $p = 0.764$), and investment behavior ($\chi^2(6) = 2.889$, $p = 0.823$), which supports successful randomization.

Analyses used one-way ANOVAs with crisis response strategy as the between-subjects factor for each outcome, followed by appropriate post-hoc tests. All tests used a two-sided alpha of 0.05, and we report F statistics, p values, and effect sizes.

6.2 | Results – Study 2

For corporate image (H3a), a one-way ANOVA with response strategy (proactive, defensive, no response) as the between-subjects factor revealed significant differences, $F(2, 359) = 15.47$, $p < 0.001$, $\eta^2 = 0.079$). The homogeneity of variances assumption held ($p = 0.280$), suggesting Gabriel post-hoc comparisons (Field 2018). Group means followed a graded pattern, with the proactive response leading to the most favorable image evaluations ($M = 4.52$, 95% CI [4.34, 4.70]), followed by the defensive response ($M = 4.12$, 95% CI [3.90, 4.34]) and no response ($M = 3.75$, 95% CI [3.56, 3.94]) (see Table 3).

Post-hoc tests indicated that a proactive response is more effective than a defensive response ($\Delta = 0.40$, $p = 0.020$) and no response ($\Delta = 0.77$, $p < 0.001$). In addition, as defensive response is also more effective than no response ($\Delta = 0.37$, $p = 0.028$).

These results support H3a: a proactive crisis response more effectively mitigates reputational damage than a defensive denial, and any response is preferable to silence.

For investment behavior (H3b), the one-way ANOVA was not significant, $F(2, 351) = 0.55$, $p = 0.577$, $\eta^2 = 0.003$. Mean allocations did hardly differ across the proactive ($M = 0.20$, 95% CI [0.16, 0.25]), defensive ($M = 0.20$, 95% CI [0.16, 0.25]), and no response scenario ($M = 0.18$, 95% CI [0.13, 0.22]) (see Table 4). All pairwise comparisons were non-significant.

Thus, H3b was not supported: within the whistleblower–fraud context, response strategy did not produce reliable differences in immediate investment allocations.

6.3 | Discussion – Study 2

The dynamics of signaling become particularly critical during crises. When ESG-related controversies arise, especially those triggered by whistleblower allegations, the credibility of a firm's prior signals is immediately put to test (cf. Authors). Stakeholders scrutinize whether the organization's response aligns with its stated values, transforming crisis communication into a high-stakes signal of integrity and authenticity (Cornelis et al. 2022; Spence 1973). In this regard, the shift from long-

TABLE 3 | Corporate image after crisis response in the experimental conditions.

Group	M_{Image}	SD_{Image}	95% CI
Control Group (No Response)	3.75	1.15	[3.56, 3.94]
Proactive Response	4.52	0.98	[4.34, 4.70]
Defensive Response	4.12	1.14	[3.90, 4.34]

TABLE 4 | Investment behavior after crisis response in the experimental conditions.

Group	$M_{Investment}$	$SD_{Investment}$	95% CI
Control Group (No Response)	0.18	0.24	[0.13, 0.22]
Proactive Response	0.20	0.24	[0.16, 0.25]
Defensive Response	0.20	0.25	[0.16, 0.25]

Note. Investment was measured as an index by dividing the allocated amount by 10,000 (0–1).

term sustainability signaling to short-term crisis management does not represent a rupture but rather a continuation of the same credibility-building process under heightened scrutiny. Response strategy therefore plays a decisive role: proactive or corrective actions are generally most effective in mitigating image damage, whereas defensive strategies such as denial are less effective, though still preferable to silence (Dutta and Pullig 2011). Consistent with previous findings (e.g., Kim and Chae 2022; McDonald et al. 2022; Rim and Ferguson 2020), the present study confirms that in the ESG context, proactive responses most effectively mitigate image damage, while defensive ones are less effective but still better than remaining silent.

The way a firm responds to allegations strongly influences outcomes: admitting wrongdoing generally leads to a more favorable corporate image than denial or silence (Decker 2012). These findings suggest that when allegations come from credible insider sources, image damage is deeper and more difficult to repair. Conversely, well-integrated and proactive responses strengthen public trust and enhance corporate image, while poorly timed or inconsistent actions undermine credibility (Baghi and Antonetti 2025; Becker-Olsen et al. 2006). In such circumstances, stakeholders, including investors, NGOs, and the broader public, closely evaluate whether a company's crisis response aligns with its previously communicated values. Thus, crisis communication again functions as a signal of authenticity and reliability (Cornelis et al. 2022; Spence 1973). Consistent with H3a, early, transparent, and well-calibrated crisis communication best preserves corporate image and mitigates reputational harm.

However, while proactive communication effectively safeguards corporate image, the type of response does not appear to significantly influence investment behavior, leaving H3b unsupported. When companies face greenwashing allegations, stock prices typically experience short-term declines. Market reactions tend to be strongest in highly visible cases, while less prominent controversies generate weaker responses depending on media attention, firm size, and public visibility (Akyildirim et al. 2023). This may explain the lack of support for H3b, as the experimental design, featuring a fictitious asset manager, lacked the media exposure and public visibility that often amplify market sensitivity (Strauß et al. 2018). In other words, investment behavior is inherently complex and influenced by numerous factors, including overall market trends, industry dynamics, herd behavior, and expectations of future performance. Consequently, market reactions tend to respond less directly to single events and depend heavily on factors such as source credibility and issue severity (Akyildirim et al. 2023). Moreover, experimental designs cannot fully capture real-world market conditions or the financial stakes involved in actual investment decisions. Typically, only high-profile cases, such as those involving large or well-known firms with extensive media coverage, produce noticeable shifts in investment behavior (Akyildirim et al. 2023; Strauß 2018).

7 | Overall Discussion

Greenwashing allegations vary in both type and source, influencing financial institutions in distinct ways. This study examines how different forms of allegations, from cheap talk to fraud, and from external watchdogs versus insider whistleblowers, affect corporate image and investor behavior. It also investigates how corporate response strategies shape these outcomes, highlighting which approaches are most effective in mitigating potential damage. In this context, *Signaling Theory* provides a valuable framework for understanding how ESG disclosures shape stakeholder perceptions and organizational legitimacy. Reports, certifications, labels, and campaigns serve as signals intended to demonstrate a firm's commitment to sustainability (Healy and Palepu 2001; Spence 1973). However, these same signals can be exploited. Under pooling equilibria, genuine and deceptive firms may adopt similar communication strategies, making it difficult for stakeholders to distinguish authenticity from misrepresentation. This risk is particularly acute in the financial sector, where ESG-related products are intangible and disclosure standards often inconsistent. The findings of this paper indicate that fraudulent greenwashing allegations, particularly those from whistleblowers, exert the most severe negative effects on corporate image. Combined, proactive crisis responses integrating factual information, sympathy and apology are most effective in mitigating these consequences.

Figure 3 conceptualizes ESG communication as a continuous signaling process that shapes stakeholder perceptions and organizational legitimacy. In this process, financial institutions signal their sustainability commitments through reports, certifications, labels, and campaigns. Yet, information asymmetry can create pooling equilibria, in which genuine and misleading signals are indistinguishable. By promoting transparency, independent verification, and credible crisis responses, financial institutions can move toward separating equilibria, making authentic ESG commitments discernible from greenwashing. Stakeholder evaluations, in this study reflected in corporate image and investment behavior, feed back into future signaling, reinforcing or undermining organizational legitimacy over time. Greenwashing allegations can trigger crises, which financial institutions can address through crisis response strategies, shaping subsequent perceptions and behavior.

Although the model conceptualizes signaling dynamics and iterative feedback loops, this paper focuses empirically on the initial signaling stage, specifically, how the type and source of

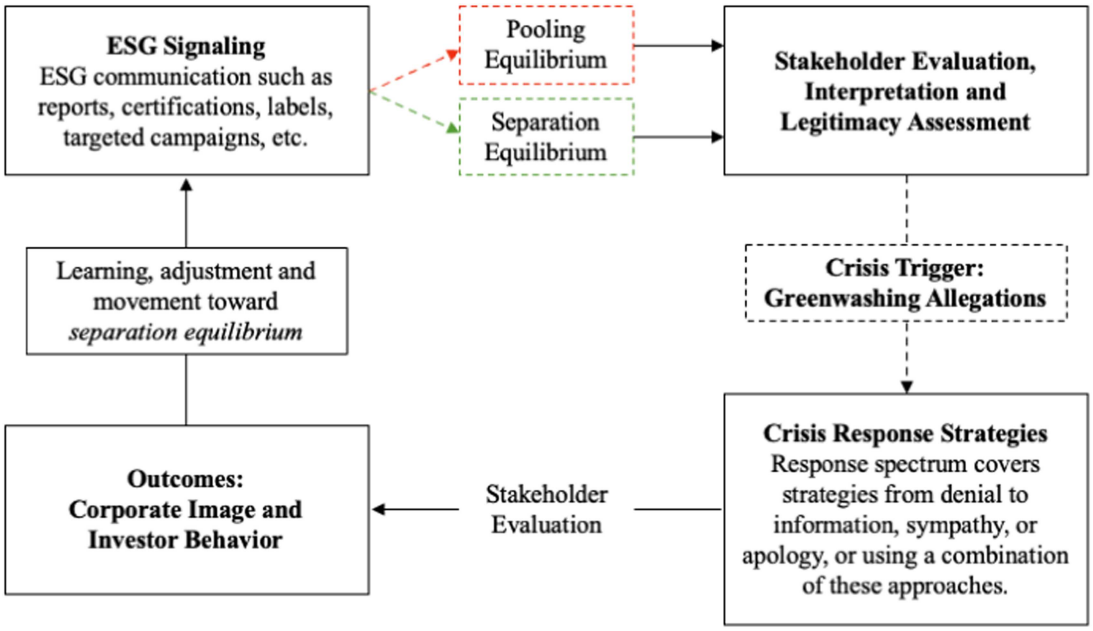

FIGURE 3 | The Iterative ESG Signaling Model (*Source:* authors' own creation).

greenwashing allegations, together with crisis response strategies, influence corporate image and investor behavior. The results point to the iterative nature of ESG signaling: stakeholder evaluations appear to shape subsequent signaling efforts and may facilitate a gradual shift from pooling toward separating equilibria, offering partial empirical support for the framework. However, longitudinal research is still needed to fully apply and rigorously validate the proposed model.

8 | Implications

Credible ESG communication should be proactive, data-supported, and verifiable (Authors). High-quality reporting, particularly on economic and social dimensions, reduces information asymmetry and strengthens signal credibility (Ching and Gerab 2017). Transparent, deliberate communication that actively manages stakeholder expectations (Authors) contrasts with "greenhushing," where silence is used to avoid criticism (Carlos and Lewis 2018). By making verifiable efforts visible, financial institutions can promote separating equilibria, in which deception costs deter insincere actors. Transparency mechanisms, third-party audits, and regulatory oversight reinforce this separation, supporting stakeholder trust.

Signaling is, however, double-edged: clear ESG communication builds legitimacy, while both cheap talk and fraud can undermine corporate image. The findings in this paper show that greenwashing allegations can swiftly erode corporate image, highlighting the need for transparent, coordinated ESG crisis communication. Symbolic cues initially shape perceptions but lose influence as concrete information emerges (cf. Coombs 2010; Drover 2012; Kim et al. 2011; Massey 2001). Proactive responses combining transparency, empathy, and accountability signal authenticity, whereas inconsistent or defensive messages intensify skepticism (Cornelis et al. 2022; Yu et al. 2022). Together, these results emphasize the value of transparent, accountability-oriented ESG communication in mitigating crisis and guiding future signaling strategies.

9 | Limitations and Future Research

Nonetheless, this study has limitations. The experimental design relied on a fictive scenario featuring a fictitious financial news outlet, *European Markets Insights*, and financial institution, *Evergreen Investment Group*, which may reduce external validity. Participants allocated funds to a fictitious company based on a few LinkedIn posts, which may not fully capture the link between corporate image and actual investment behavior in real-world settings. The online format limited control over participants' environments, potentially allowing distractions that could affect responses. Social desirability bias may have influenced participants to respond in ways perceived as expected or morally appropriate. Moreover, corporate image was measured using a six-item index combining cognitive and affective evaluations. While this approach follows prior research (Koch and Denner 2025b) and captures overall image perceptions reliably, it does not allow for distinguishing how greenwashing allegations and crisis responses may differentially affect cognitive versus affective image dimensions. Future research could examine these components separately to provide a more fine-grained understanding of stakeholder responses to ESG-related issues. Relatedly, additional robustness checks using alternative operationalizations of corporate image may further clarify whether the observed effects vary across evaluative dimensions, although the consistent pattern of findings across both experiments and outcome variables suggests that the reported effects are stable. Finally, while the participant numbers were satisfactory, the Swiss-focused sample may limit generalizability to other countries or cultural contexts. Switzerland, while currently exempt from strict ESG regulations, is rapidly aligning its national standards with international reporting requirements. Differences in regulatory environments or cultural attitudes toward ESG for example could influence how greenwashing allegations and crisis responses affect corporate image and/or investor behavior across countries.

Future research should explore cross-country comparisons and the role of digital and social media in shaping ESG perceptions

and responses. The modeled effects of ESG signaling in greenwashing and crisis response offer a foundation for studying organizational legitimacy and stakeholder behavior. The iterative ESG signaling model shows how stakeholder evaluations influence subsequent signaling and how crisis management drives the shift from pooling to separating equilibria, providing a structured way to examine the interaction of communication, perception, and trust. Future research can expand this framework by exploring additional signaling mechanisms, cross-industry comparisons, or longitudinal effects, thereby enhancing our understanding of ESG communication as both a tool for legitimacy and accountability.

10 | Conclusion

This study shows that ESG signaling is shaped by stakeholder perceptions, with credible whistleblower allegations causing the most severe corporate image damage. Investment responses depend on both the severity and source of claims, highlighting the importance of trustworthiness in ESG communication. Proactive, transparent crisis responses, i.e., admitting wrongdoing and providing factual information, effectively mitigate image-based harm, whereas denial or silence is less effective. The findings underscore that ESG communication is dynamic: consistent, verified disclosures and crisis communication help distinguish genuine sustainability efforts from greenwashing and protect corporate image. Accordingly, strategic ESG crisis management is essential, as legitimacy is continuously negotiated in response to external scrutiny, a process that is particularly critical in the rapidly evolving ESG landscape.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are openly available in OSF at https://osf.io/wu634/overview?view_only=484f1e0abd4e4687be2e636ed6bb7f92, reference number wu634.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section.
Supplementary Material_final_17Feb2026.